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Complementizer-trace effects in Russian

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This paper presents and discusses the results from an acceptability judgment task conducted to test the complementizer-trace effect in Russian. In addition, in this study, I investigate (i) the differences in the transparency of the two types of finite embedded clause with two different complementizers for the argument extraction and (ii) the effect of a high adverb on the acceptability of subject extraction. While providing reliable data on the presence of the complementizer-trace effect in Russian, this paper also explores the significance of the results for the theory of complementizer-trace effects in general.

1. Introduction

Perlmutter (1968, 1971) observes that, in English, subject extraction out of the embedded clause is only available if the complementizer is null (1). In contrast, non-subject extraction is possible regardless of the type of complementizer (2).

(1)   a. *Who do you think that __ met Sue?
      b. Who do you think __ met Sue?   (Pesetsky 2017:(1a))

(2)   a. Who do you think that Sue met __?
      b. Who do you think Sue met __?   (Pesetsky 2017:(1b))

This phenomenon has come to be known as the complementizer-trace effect. Although several possible explanations have been suggested as to why such a constraint should exist, no consensus has been reached on that matter. Complementizer-trace effects were identified in other languages as well, which reinforced the assumptions about their universality (Pesetsky 2017).

For Russian, however, the data from different sources do not provide a clear picture about the existence of a similar constraint. Although, according to Pesetsky (1982), Russian is among the languages exhibiting the complementizer-trace effect, there is some conflicting data in other papers. Antonenko (2008, 2010) claims that there is a difference between indicative and subjunctive finite embedded clauses: only indicative clauses with the complementizer *čto* 'that' exhibit the complementizer-trace effect, while the same is not true for subjunctive clauses with the complementizer *čtoby* 'that.SUBJ'. Dyakonova (2009:216) reports that there is 'a massive

speaker variation' on whether Russian exhibits subject/object asymmetries with regard to extraction out of embedded clauses.

The scarcity and the seeming variability of the data regarding the complementizer-trace effect in Russian calls for an experimental approach. The usage of experimental methods in the area of complementizer-trace effects has proven to be quite useful. First, such methods have previously been used to check the reliability of informal judgments. Cowart (1997) has reconfirmed the existence of the complementizer-trace effect in English. The claims about the lack of the complementizer-trace effect in German made in Haider (1983) were disputed experimentally by Featherston (2005). Experimental studies have also helped researchers in proposing new explanations for the phenomenon. The experiments of Salzmann et al. (2013) allowed the researchers to propose that the low ratings for subject extraction in German are due to a more general constraint on the adjacency of the complementizer and a finite verb. Ritchart et al. (2015) employ experimental methods to check the judgments that are used in Kandybowicz (2006) in support of the prosodic account of the complementizer-trace effect. The researchers show that these judgments are, in fact, incorrect, thus undermining the evidence for the said theory.

In this paper, I present the results of the acceptability judgment study conducted to test the complementizer-trace effect in Russian. They show that this phenomenon exists in Russian. In addition, I investigate the differences in the transparency of finite embedded clauses with different complementizers for argument extraction and the effect of a high adverb on the acceptability of subject extraction. I also discuss whether using context in an experimental study affects speakers' judgments.

2. Accounts of complementizer-trace effects

There have been numerous attempts to figure out the nature of the complementizer-trace effect. In this section, I briefly discuss some of the accounts proposed in the previous literature with a particular focus on the papers that will be relevant for the discussion of my study's results. For a fuller overview, see Pesetsky (2017).

Some accounts attribute the ungrammaticality of (1a) to the ban on the linear adjacency of a complementizer and a trace. The most famous proposal of this kind was given in Chomsky & Lasnik (1982); they suggest that the ungrammaticality of subject extraction over an overt complementizer is due to the complementizer-trace filter, that specifically rules out structures like this. A similar approach has also been used in some later works that connect the source of the phenomena to the syntax-prosody interface. For instance, Kandybowicz (2006) proposes a PF-filter that disallows certain prosodic mappings:

(3)   Prosodic filter
       *<C°, t> iff:
       (i) C° and t are adjacent within a prosodic phrase, and
       (ii) C° is aligned with a prosodic phrase boundary   (Kandybowicz 2006:(15))

Many other accounts, however, attribute the unacceptability of subject extraction to structural constraints. Some researchers connect the complementizer-trace effect with the Nominative Island Constraint (NIC, Chomsky 1980; Kayne 1980; Pesetsky 1982); this constraint, which

prohibits an anaphor to be free in S (=CP), rules out structures like (1a) since an overt complementizer prevents the extracted subject from binding its trace in the embedded clause. Empty Category Principle (ECP) accounts (Chomsky 1981; Lasnik & Saito 1984) explain the subject-object asymmetry in the same way that is used in ECP-based theories of island constraints. According to the ECP, a trace must be governed. Unlike object traces, subject traces are not head-governed by a lexical category, so they have to be governed by a governing antecedent, which is another way for a trace to be licensed. However, in sentences like (1a), the complementizer prevents the subject trace from being antecedent-governed, thereby ruling out the whole structure.

Some possible solutions to the puzzle in question have been proposed in the Minimalist framework as well. Pesetsky & Torrego (2001) argue that the complementizer-trace effect in English is due to economy considerations. In their framework, C has a uT feature. One way it can be deleted is by T-to-C movement. According to the researchers, this movement can actually be seen in embedded clauses, as the complementizer *that* represents an instance of T moved to C. Another way uT on C can be deleted is by the subject movement to Spec,CP. Nominative subjects are claimed to bear uT feature. Thus, they can be attracted by uT on C, satisfying the EPP property of C's uT feature. In principle, both of these options are equally available for deleting uT on C. That explains why the complementizer can be either present or not in regular embedded declaratives; in the former case uT on C is deleted by T-to-C movement, which is evident from the overt complementizer, while in the latter case, the absence of the complementizer shows that uT on C is rather deleted by the movement of the subject to Spec,CP. However, in the case of wh-subject extraction out of embedded clause, subject movement is a more economical way to satisfy the goals of the derivation. Unlike T-to-C movement, it can delete both uT, and uWh on C. Due to this, it is preferred to T-to-C movement.

Several of the most recent proposals appeal to the notion of anti-locality. They state that in structures like (1a) certain constraints prevent the subject from being moved to Spec,CP, which is essential for it to be moved further up in the structure by successive-cyclic movement. In Erlewine (2020) the following variant of anti-locality is proposed:

(4)   Spec-to-Spec Anti-Locality
       Movement of a phrase from the Specifier of XP must cross a maximal projection other
       than XP.   (Erlewine 2020:(2))

Movement from Spec,TP to the specifier of C, immediately dominating T, clearly violates this restriction. Since the subject is unable to reach the edge of a phase, it cannot move to the matrix clause. Erlewine further assumes that clauses with no overt complementizer are headed not by two distinct C and T layers, but rather by a head which bundles C and T. This allows subjects of embedded clauses with no overt complementizer to move to Spec,TP while also satisfying the need to be in the specifier of a phase head in order to be able to move into higher phases. Objects, on the other hand, are always able to move out of the embedded clause since movement out of a VP to Spec,CP of the embedded clause never violates the anti-locality both in the presence and in the absence of the complementizer.

A similar approach is taken in Pesetsky (2021), though his ideas about the source of the complementizer-trace effect are based on an independent concept of Exfoliation. In his paper, Pesetsky proposes a derivationalist hypothesis of clauses and posits that every embedded clause

starts out as a full finite CP and may be reduced to a clause of smaller size due to certain derivational processes. The operation of removing layers of the structure is called Exfoliation.

Next, Pesetsky assumes the following notion of anti-locality:[1]

(5)   Antilocality constraint
       Movement to the edge of CP must cross a phase boundary.   (Pesetsky 2021:(31))

This constraint prevents the subject from making a move from Spec,TP to Spec,CP, since there is no phase boundary on its way. However, the Exfoliation of the CP layer bleeds the Antilocality constraint. If the CP layer is removed, the subject moves out to the matrix clause straight from the Spec,TP of the embedded clause. This explains why the subject can be moved out in the absence of the complementizer.

In (6), the part of the structure that has to be exfoliated is in a grey rectangle.

(6)   Exfoliation of the CP layer of the embedded clause
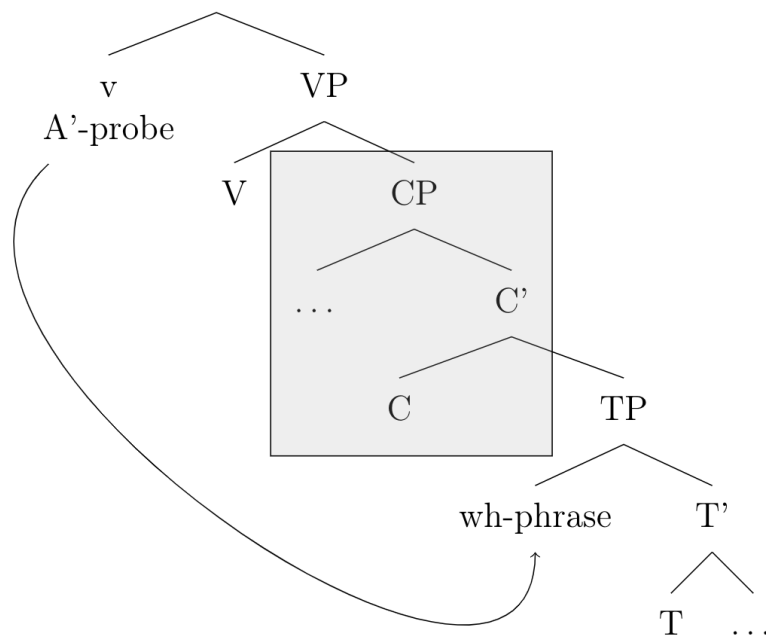
                                                                       (Pesetsky 2021:38)

In some cases, however, the complementizer-trace effect can disappear. One of the most discussed cases of this is adverb obviation. Bresnan (1977) and Culicover (1993) both note that in English the placement of a high adverbial between the complementizer and the extraction site noticeably ameliorates the complementizer-trace effect.

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[1] Later in the same paper Pesetsky reexamines this notion of anti-locality and proposes to replace it with Lethal Ambiguity condition (McGinnis 2004). For the sake of brevity, I do not go into detail on why this change is needed and refer the reader to Pesetsky (2021).

(7) a. Robin met the man who Leslie said that **for all intents and purposes** __ was
   the mayor of the city. (Culicover 1993:(2a))
   b. I asked what Leslie said that **in her opinion** __ had made Robin give a book to Lee.
   (Culicover 1993:(2c))

These data have since been discussed in many other papers. Culicover (1993) takes it as evidence against the ECP account of the phenomenon. Kandybowicz (2006) argues that sentences like (7) support the prosodic filter theory. Adverb obviation is expected under this account since an intervening adverb prevents the complementizer and the subject extraction site from occupying the same prosodic phrase.

Erlewine (2020) states that an intervening adverbial obviates the effect thanks to its own high AdvP projection (in the spirit of Cinque 1999). Extra functional material between the projections of T and C makes the subject movement from Spec,TP to Spec,CP no longer violate Spec-to-Spec Anti-Locality. Consequently, subjects can reach Spec,CP and be moved out to the higher clause.

Pesetsky (2021) attributes adverb obviation to the specifics of adverbial syntax. As McCloskey (2006) shows, English permits embedded clauses to have two instances of *that* are separated by an adverbial:

(8)   Double *that* complements
   a. We know **that** for all intents and purposes **that** the government created a rating agency oligopoly that prevented the market from enjoying more competition.
   (Pesetsky 2021:(78a))
   b. But the simple analysis which suggests **that** because American investment takes place here **that** we should be a lapdog for their efforts in the war is one that I think is quite objectionable and quite offensive. (McCloskey 2006:(69a))
   c. He thinks **that** if you are in a bilingual classroom **that** you will not be encouraged to learn English. (McCloskey 2006:(69b))

Based on this data, Pesetsky proposes that sentences like (7) are, in fact, biclausal, with the bleached adverbial predication being the first CP and the embedded clause being the second one. These structures still involve the obligatory Exfoliation of the CP level of the embedded clause, which is needed for the subject to move out to the higher clause without violating anti-locality. The Exfoliation of the adverbial CP, on the other hand, is not required. The fact that the Exfoliation of the most inner CP is obligatory in the case of subject extraction is demonstrated by (9b) (compare to (9a), where object extraction over an adverbial is shown). Thus, sentences in (7) do not constitute an exception to the complementizer-trace effect in English.[2]

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[2] An anonymous reviewer points out that the availability of double complementizer constructions in English may be a subject to dialectal variability. In particular, the reviewer, a native English speaker, reports that sentences like (8) are ungrammatical in their dialect.

Currently I do not have any additional data on double complementizer construction in English, so I cannot deliberate on this topic here. However, I would like to suggest that the acceptability of sentences in (7) may be degraded for some speakers because of their complex structure and their length. In future studies, these parameters should be checked alongside the dialectal variability.

(9) a. What kind of rating agency oligopoly did she claim that for all intents and purposes
        that the government had created __?
     b. Which government did she claim that for all intents and purposes (*that) __
        had created a rating agency oligopoly?   (Pesetsky 2021:(82))

Overall, adverb obviation seems important to many of the existing accounts. I return to this
matter in the discussion of the focal points of the experimental study.

3. Complementizer-trace effect in Russian

Russian has two kinds of embedded finite clause: indicative and subjunctive. Indicative clauses
are introduced by the complementizer *čto* 'that' (10a), while subjunctive clauses are introduced
by the complementizer *čtoby* 'that.SUBJ' (10b).

(10) a. ivan skazal čto   maša   prinesla   šampanskoje
        Ivan said   that Masha   brought   champagne
        'Ivan said that Masha has brought champagne.'
     b. ivan xotel   čtoby   maša   prinesla   šampanskoje
        Ivan wanted that.SUBJ   Masha   brought   champagne
        'Ivan wanted Masha to bring champagne.'

Pesetsky (1982) provides the following examples to demonstrate that subject extraction out of
subjunctive clauses is less acceptable than object extraction, cf. (11a) and (11c) with (11b) and
(11d). No examples with indicative embedded clauses are given.

(11) a. u   menja est' kniga, kotoruju ja   xoču,   čtoby   vy   pročli __
         by I.GEN is   book   which.ACC I   wish,   that.SUBJ you   read
         'I have a book which I wish you would read.'
     b. * u   menja est' kniga   kotoraja   ja   xoču,
         by   I.GEN is   book   which.NOM   I   want
         čtoby   __   byla   vo   vsex   bibliotekax
         that.SUBJ   was   in   all   libraries
         'I have a book which I wish would be in all libraries.'
     c. paren', kotorogo ja   xotel, čtoby   maša   ubila   __
         guy   who.ACC   I   wished that.SUBJ Masha   killed
         'the guy, who I wanted Masha to kill'
     d. * paren', kotoryj ja   xotel, čtoby   __   ubil   mašu
         guy   who.NOM I   wanted that.SUBJ   killed Masha.ACC
         'the guy, who I wanted to kill Masha'   (Pesetsky 1982:(2))

However, in this paper, Pesetsky also observes that many speakers judge the sentences with
object extraction as ungrammatical, albeit still more acceptable than the examples with subject
extraction. Thus, there are certain concerns about the reliability of the data and their consistency
across the speakers.

More recent papers open up even more questions about the Russian data. In particular, Antonenko (2008, 2010) argues that the complementizer-trace effect only arises in indicative clauses (12) and not in subjunctive clauses (13).

(12) a. * kto   ty   dumaeš'   čto   __   vypil   vsë   pivo?
        who.NOM   you   think   that   drank   all   beer
        'Who do you think drank all beer?'

     b. ? kogo   ty   dumaeš'   čto   ivan   narisoval   __   na   zabore?
        who.ACC   you   think   that Ivan   drew   on   fence
        'Who do you think Ivan drew on the fence?'   (Antonenko 2008:(22))

(13) a. ? kto   ty   xočeš'   čtoby   __   napisal   stat'ju?
        who.NOM   you   want   that.SUBJ   wrote   paper
        'Who do you want to write a paper?'

     b. ? čto   ty   xočeš'   čtoby   ivan   kupil   __?
        what.ACC   you   want   that.SUBJ Ivan   bought
        'What do you want Ivan to buy?'   (Antonenko 2008:(23))

These data, along with some other asymmetries between the two types of embedded clause noted by Antonenko, lead him to claim that there are certain structural differences between the two complementizers. Namely, he proposes that the complementizer *čto* 'that' appears in Spec,CP, while the complementizer *čtoby* 'that.SUBJ' consists of two parts — *čto* in Spec,CP and the subjunctive particle *by* in C.[3] The judgments in (12)-(13) can be explained in the following way. Object extraction is assumed to proceed successive-cyclically in both types of the embedded clause with nothing preventing it from moving out to the matrix clause. However, when it comes to subject extraction, the difference in complementizers' structure plays a crucial role. Antonenko follows Rizzi (2006) and Rizzi & Shlonsky (2007) and postulates that after moving to the Spec,TP position subjects get frozen due to them satisfying the EPP feature on T. In the case of the indicative clause that entails the unavailability of the subject DP to move any further. In the subjunctive clause, however, there is another way of satisfying the EPP feature on T — by the particle *by* in C via head-head configuration (Rizzi & Shlonsky 2007). In this case, the subject of the subjunctive clause is not required to stay in Spec,TP and can be moved out to the matrix clause.

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[3] The assumption about the complementizer *čto* 'that' being located in Spec,CP rather than in C is linked to the properties of T-to-C movement in Russian. Antonenko notes, that, unlike in English, Russian embedded clauses with an overt complementizer cannot occupy subject position.
(i) *(That) Sue will buy the book was expected by everyone.
(ii) * (to,) **čto**   Petju   posadili   v   tur'mu   nikogo   ne   udivilo
     it   that   Petja.ACC   was.put   into   jail   nobody.ACC   not   surprised
     'Nobody was surprised by the fact that Petja was put into jail.'
This indicates that *čto* does not have the properties similar to those of the English complementizer *that*, which allows English clauses to be subjects. Antonenko states that this might serve as evidence that the complementizer *čto* is not an instantiation of T-features moved to C (Pesetsky & Torrego 2001). Building on the proposal in Landau (2007) that says that only the categories with phonologically overt heads can be selected as subjects, Antonenko concludes that in indicative embedded clauses in Russian C is empty, while the complementizer itself is located in Spec,CP.

The asymmetry between indicative and subjunctive clauses is also addressed in Dyakonova (2009). Although she only considers object extraction, her notes might be relevant to the discussion of the complementizer-trace effect in Russian. Unlike Antonenko, she claims that sentences with an object moved out of the indicative clause (14a) are, in fact, less acceptable than sentences with object extraction out of subjunctive clause (14b).

(14) a. * kogo   olga skazala čto   oni videli   __?
          who.ACC Olga say   that they saw
          'Who did Olga say that they saw?'   (Dyakonova 2009:(63a))
      b.   kogo   ty   xočeš' čtoby   ja priglasila __?
          who.ACC you   want   that.SUBJ I invited
          'Who do you want me to invite?'   (Dyakonova 2009:(72a))

According to Dyakonova, this asymmetry arises due to the properties of the embedded T. In the indicative clause, T has its own valued Tense feature, while T of the subjunctive clause does not. This is evident from the fact that subjunctive clauses, unlike indicative ones, exhibit sequence of tense (Khomitsevich 2007). The sentence in (15) is most likely to be interpreted as though the event of the embedded clause precedes the event of the matrix clause. In (16), on the other hand, the events in the matrix and the embedded clauses are probably happening at the same time. That indicates that the tense of the subjunctive embedded clause is dependent on the tense of the matrix one.

(15) ivan skazal   čto   olga gotovila
      Ivan said   that Olga cooked
      'Ivan said that Olga was cooking.'

(16) ja treboval   čtoby   galya   ušla
      I demanded   that.SUBJ   Galya   went.away
      'I demanded Galya to go away.'

This difference is argued to affect the Spell-Out of embedded structures. Dyakonova assumes that the uppermost projection of the clause, ForceP, is a phase. In the case of the indicative clause, object extraction is blocked since it cannot cross the phase boundary. However, in subjunctive clauses, the phase can be extended for the purpose of evaluating the features on the embedded T. This results in the availability of movement to the higher clause.

    If object extraction is also affected by the complementizer, as suggested by the data in Dyakonova (2009), a question arises whether the same considerations lie beneath the differences in subject extraction reported in Antonenko (2008, 2010). In addition to that, any other possible restrictions on extraction out of embedded clauses should certainly be investigated prior to studying the complementizer-trace effect.

4. Experimental study
4.1. Focal points of the study

Given the variety of factors that might affect the judgments on the complementizer-trace effect in Russian, the task of choosing the factors to be looked at in an experimental study becomes quite challenging while still being incremental to the success of the experiment. Here I would like to elaborate on the choices I made in this study.

4.1.1. Type of embedded clause

In this study, I chose to compare embedded clauses with two different overt complementizers rather than clauses with and without an overt complementizer. There are several considerations behind this choice. First, the differences between indicative and subjunctive clauses remain an important issue in the study of Russian syntax, especially given the inconsistencies in the data which were discussed above. Second, the possibility of the complementizer omission is itself questionable. The conditions under which the complementizer *čto* 'that' might be phonologically null are not clear and are in need of a careful examination (17). The complementizer *čtoby* 'that.SUBJ' can never be omitted (18).

(17) a. petja skazal   ??**(čto)** ty   ne   pridëš'
          Petja said   that you not   come
          'Petja said that you will not come.'
      b. ja znaju   ??**(čto)** ty   vrëš'
          I know   that you lie
          'I know that you are lying.'

(18) a. ja xoču   *(**čtoby**)   ty   ušël
          I want   that.SUBJ you went.away
          'I want you to go away.'
      b. ona   trebovala *(**čtoby**) vasja   prinës   piva
          she demanded   that.SUBJ Vasja   brought beer
          'She demanded Vasja to bring beer.'

4.1.2. The effect of high adverbs

While simply studying the difference in subject and object extraction is undoubtfully important, it would not be enough to make some additional inferences about the nature of the complementizer-trace effect. Therefore, I decided to add another level to the type of the argument factor[4] and check the acceptability of subject extraction in the presence of a high adverbial in the embedded clause. As noted above, several approaches, including the prosodic account and the anti-locality accounts, predict that the complementizer-trace effect should be obviated by the presence of an item like this. If the experiment shows that it is indeed the case,

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[4] I did not use the presence of a high adverb as a separate factor since it is expected to affect only the subject extraction. Apart from that, a 2x3x2 experiment would probably be too complex, which in turn might have had affected the results.

it would make a good support to the theories of that kind. Apart from that, it is also interesting to see whether adverb obviation holds across different languages.

4.1.3. Use of context

Aside from the main goals of the study, I also wanted to check the effect of sentences' context on the acceptability judgments. When one tests out question sentences in an experiment without audio stimuli, there is a possibility that the participants will read the sentences as echo-questions. Echo-questions are known to differ in their properties from the regular questions (see Artstein 2002, a.o.). Using context in the experiment might point the participants to the needed interpretation of the sentences. In addition to this, the usage of context might make the sentences sound more natural overall, thus increasing the external validity of the study.

To test out these two premises, I conducted two versions of the experiment presented to two random groups of respondents. The first group took the regular version of the experiment, while for the second group, each sentence, including the filler sentences, was presented preceded by its context on a separate screen. Contexts each consisted of one or two sentences briefly describing the situation in which the test sentence might have been said. (19)-(21) illustrate some of the contexts used alongside the experimental items.

(19) Experimental item, subject extraction, indicative clause, no adverb
   a. Context:
   kažetsja tol'ko odin naš kollega ne zabyl pro sašin jubilej
   seems only one our colleague not forgot about Sasha's jubilee
   i pozdravil ego
   and congratulated him
   'It seems that only one of our colleagues didn't forget about Sasha's birthday and congratulated him.'
   b. Test sentence:
   kto ty dumaeš' čto pozdravil sašu s jubileem?
   who.NOM you think that congratulated Sasha.ACC with jubilee
   'Who do you think that congratulated Sasha on his jubilee?'

(20) Grammatical filler
   a. Context:
   ja uže zabyla sdelal li petja vsju domašnjuju rabotu na zavtra
   I already forgot did Q Petja all home work for tomorrow
   'I have already forgot if Petja has done all the homework for tomorrow.'
   b. Test sentence:
   ty pomniš' sdelal li petja zadanie po matematike?
   you remember did Q Petja homework in math
   'Do you remember if Petja has done the math homework?'

(21) Ungrammatical filler
   a. Context:
   ty rasskazyval čto nedavno videl na rynke odnu očen'
   you told that recently seen at market one very

krasivuju   prodavščicu
beautiful   saleswoman
'You told me recently that you have seen a very beautiful saleswoman at the market.'
b. Test sentence:
čto   ty   vstretil devušku   kotoraja   pytalas' prodat'?
what.ACC you met   girl   which.NOM   was.trying sell
'You met a girl that was trying to sell what?'

4.2. Experimental design

The study was an acceptability judgment experiment with a 2x3 factorial design. The first factor was the type of the embedded clause (CL) and had 2 levels: (i) finite indicative embedded clause with the complementizer *čto* 'that' (ii) finite subjunctive embedded clause with the complementizer *čtoby* 'that.SUBJ'. The second factor was the type of the extracted argument (ARG). The factor had 3 levels: (i) extraction of the object, (ii) extraction of the subject and (iii) extraction of the subject in the presence of a high adverb in the embedded clause. I used the adverb *odnaždy* 'once' as an intervening item. This choice was motivated by several considerations. First, it is a high enough adverbial, according to the hierarchy in Cinque (1999). The usual linear position of this adverb also allows us to assume that the subject extraction site follows this adverb rather than precedes it.

(22) a. ja xotel čtoby   **odnaždy** petja priglasil mašu   v gosti
         I   wanted that.SUBJ **once**   Petja invited   Masha.ACC   in guest
         'I wanted Petja to once invite Masha to visit.' {a=b}
     b. ?? ja xotel čtoby   petja **odnaždy** priglasil mašu   v gosti
         I   wanted that.SUBJ Petja **once**   invited   Masha.ACC   in guest

Second, the adverb had to sound natural in both types of the embedded clause. Thirdly, while it was possible to use a range of high PP-adjuncts, they would lengthen the sentences significantly, which would distinguish the sentences with this factor from the others. That could have led to the ratings being affected by the length of the sentence. Finally, a number of other Russian adverbials higher up in Cinque's (1999) hierarchy, such as *navernoe* 'probably', *vozmožno* 'possibly', *očevidno* 'obvious' etc. are often used as parentheticals. Using an item that can be interpreted both as an adverbial and as parenthetical would make the results of the experiment hard to interpret unambiguously.

In the experimental sentences, only 6 matrix verbs were used, 3 of which (*dumat'* 'think', *predpolagat'* 'assume', *sčitat'* 'consider') had an indicative clause as their complement while the other 3 had a subjunctive clause as their argument (*xotet'* 'want', *trebovat'* 'demand', *prosit'* 'ask'). The reason for using two different sets of matrix predicates was the following: verbs that can take both types of the embedded clause as their argument are not that common and are not that frequently used (Dobrushina 2012). Note that all the predicates were non-factive, so the factivity could not affect the acceptability of extraction. All the sentences had a similar structure: all of the embedded verbs were transitive and had a PP-adjunct at the end of the sentence. One set of experimental items is shown in (23).

(23) a. Subject extraction, indicative clause, no adverb
          kto   ty   dumaeš'   čto   pozval   svetu   na   progulku?
          who.NOM   you   think   that asked   Sveta.ACC   for   walk
          'Who do you think asked Sveta out for a walk?'
      b. Subject extraction, indicative clause, adverb present
          kto   ty   dumaeš'   čto   odnaždy   pozval   svetu
          who.NOM   you   think   that once   asked   Sveta.ACC
          na   progulku?
          for   walk
          'Who do you think once asked Sveta out for a walk?'
      c. Object extraction, indicative clause
          kogo   ty   dumaeš'   čto   sveta   pozvala na   progulku?
          who.ACC   you   think   that Sveta.NOM   asked   for   walk
          'Who do you think that Sveta asked out for a walk?'
      d. Subject extraction, subjunctive clause, no adverb
          kto   ty   xočeš'   čtoby   pozval   svetu   na   progulku?
          who.NOM   you   want   that.SUBJ asked   Sveta.ACC   for   walk
          'Who do you want to ask Sveta out for a walk?'
      e. Subject extraction, subjunctive clause, adverb present
          kto   ty   xočeš'   čtoby   odnaždy   pozval   svetu
          who.NOM   you   want   that.SUBJ once   asked   Sveta.ACC
          na   progulku?
          for   walk
          'Who do you want to once ask Sveta out for a walk?'
      f. Object extraction, subjunctive clause
          kogo   ty   xočeš'   čtoby   sveta   pozvala na   progulku?
          who.ACC   you   want   that.SUBJ Sveta.NOM   asked   for   walk
          'Who do you want Sveta to ask out for a walk?'

24 lexicalizations of each sentence type were created and distributed among six lists using a Latin Square procedure. In each list, the stimuli were intermixed with 36 fillers in a pseudo-random order, such that no two experimental items appeared adjacent to each other. Half of the fillers were grammatical, and half were not. I used regular sentences with embedded questions as grammatical fillers (24) and sentences with *wh*-extraction out of a complex NP island as ungrammatical ones (25).

(24) Grammatical fillers
      a. ty   znaeš'   prinesët   li   maša   vina   k   užinu?
          you   know   bring   Q   Masha   wine   for   dinner
          'Do you know whether Masha will bring wine for dinner?'
      b. ty   vyjasnil   kogda   lena   prigotovit   pirog   dlja   babuški?
          you   found.out when   Lena   cook   pie   for   grandma
          'Did you find out when Lena is going to cook a pie for grandma?'

(25) Ungrammatical fillers

    a. * čto   ty   polučila   otčët   o   tom
        what you got   report about it
        čto   nikita pročël   za   leto   __?
        that   Nikita read   during summer
        'You got a report that Nikita has read what during summer?'

    b. * pro   čto tebe ponravilsja mal'čik kotoryj pokazal fil'm __ na festivale?
        about what you like   boy   which showed film   at festival
        'You liked a boy that has shown a film about what at the festival?'

4.3. Procedure

The respondents were recruited through the crowd-sourcing platform Yandex.Toloka and online forums. 241 self-reported speakers of Russian took part in the experiment without the context, and 181 — in the experiment with the context. The participants were asked to rate sentences on a 7-point Likert scale (Likert 1932). Items were presented using the IbexFarm platform (Drummond 2013).

4.4. Results

Before the statistical analysis, I detected the outliers using the gold-standard method (Sprouse 2018). Under this method, the fillers are supposed to be pre-evaluated. In his experiments, Sprouse uses a set of fillers that all have varying mean ratings from English speakers on average (i.e., there are sentences, which are most likely to get 1, 2, … 7 on a 1-7 Likert scale). Using these sentences as the gold standard, one can identify the participants who give substantially different judgments than all the other participants and eliminate them from the analysis. One way to do it is to use the sum of squares measure of error. The participants whose sum of squares metric differs from the mean by more than a certain number of standard deviations could be identified as the outliers.

    The fillers used in this experiment were not pre-tested. However, it is quite safe to assume that grammatical sentences like the ones in (24) are most likely to get high ratings, while the ones featuring a strong island violation, as in (25), are probably going to get low ratings. Relying on this premise, I decided to use the fillers as golden standards and postulated 6 as the expected value for the grammatical fillers and 2 as the expected value for the ungrammatical ones. Then the same statistical procedure as the one described above was performed. The number of standard deviations used was 2. Overall, there were 7 outliers in the experiment without the context and 14 in the experiment with the context. After omitting their judgments, the raw ratings were then transformed into z-scores.[5]

    The mean ratings for the sentences in both versions of the experiment are shown below in Figure 1 and Figure 2. In both figures, we can see that the ratings for subject extraction from the different types of clause look very similar. In the case of object extraction, however, there is a noticeable difference between the z-scores for the sentences with the indicative clause and

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[5] z-scores indicate how many standard deviations an observation is above or below the mean.

the sentences with the subjunctive clause. Another thing worth mentioning is that the scores for subject extraction look almost as low as the scores for the ungrammatical fillers, which suggests that the constraint on the complementizer-trace sequence is quite strong in Russian.
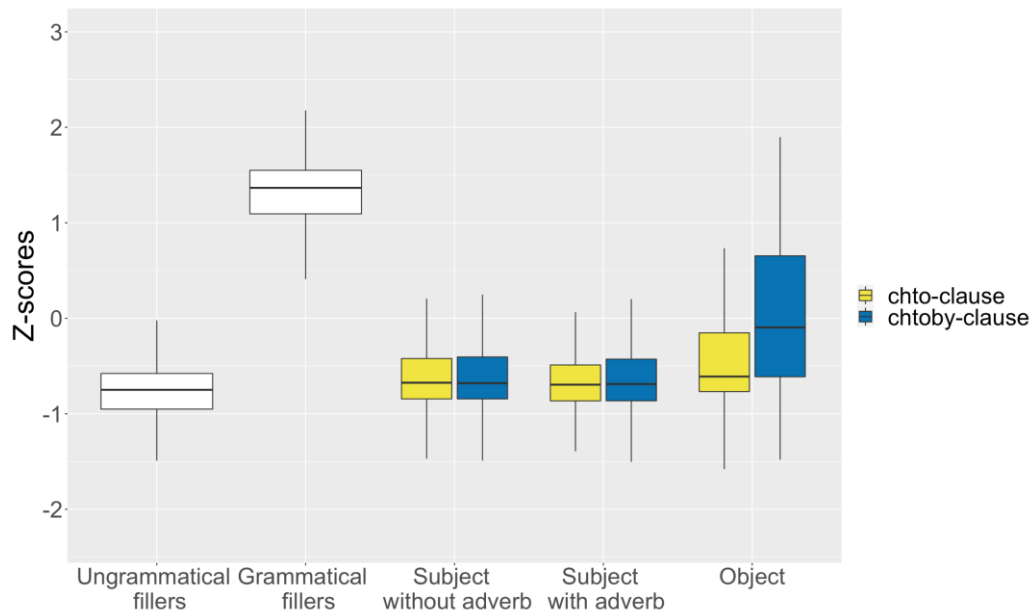

Figure 1. Acceptability ratings for the version of the experiment without the context.
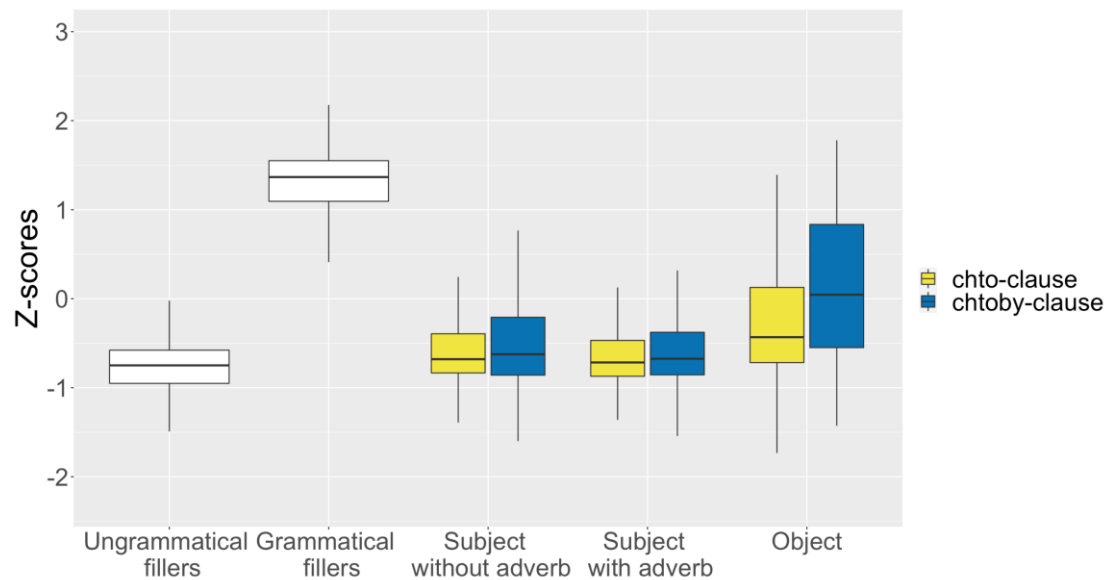

Figure 2. Acceptability ratings for the version of the experiment with the context.

The results of the two versions of the experiment were then analyzed separately from each other using a linear mixed model with random intercepts for participants and experimental items with the R statistical package lme4 (Bates et al. 2015). p-values were obtained by likelihood ratio tests of the full model with the effect against the model without the effect.

In the version of the experiment without the context, the analysis revealed the significance of CL ($\beta = 0.16$, SE = 0.027, $\chi^2(1) = 23.354$, p << 0.0001), ARG ($\chi^2(2) = 93.679$, p << 0.0001), and of CL x ARG ($\chi^2(2) = 48.484$, p << 0.0001). I also compared the levels of the argument type factor using the Tukey test. It showed that only the difference between object and subject extraction was significant, both in the absence of the high adverb before the subject (p << 0.0001) and in its presence (p << 0.0001). The difference between extraction of the subject with and without the high adverb present was not significant (p = 0.3374). Finally, the Tukey test has also demonstrated that the type of embedded clause only had an effect on object extraction (p << 0.0001), while the ratings of the sentences with subject extraction both in the absence (p = 0.9978) and in the presence of the high adverb (p = 1) were not significantly affected by it.

As for the experiment with the usage of the context, the results turned out to be the same. Both CL ($\beta = 0.16815$, SE = 0.036, $\chi2(1) = 18.8$, p < 1.451e-05) and ARG ($\chi2(2) = 103.53$, p < 2.2e-16) turned out to be statistically significant, as well as CL x ARG ($\chi2(2) = 15.084$, p = 0.0005). The Tukey test showed that there is no difference between subject extraction in the presence and in the absence of the adverb (p = 0.2153), while the ratings for the object extraction differ both from the rating for the subject extraction in the absence of the adverb (p << 0.0001), and in its presence (p << 0.0001). As in the other version of the experiment, the type of the embedded clause only affected object extraction (p < 0.0001).

Let me turn to discussing the effect of the context on the acceptability judgments. As shown above, the main results of the two versions of the experiment are very similar. Are there any significant differences between the two versions at all then? To test this, I ran a pairwise comparison of the acceptability ratings for different types of sentences in the experiment. p-values for the Wilcoxon test are shown in Table 1 below.

condition	p-value
All experimental sentences	**6.36e-07**
čto-clause, subject extraction, high adverb absent	0.4753
čto-clause, subject extraction, high adverb present	0.66
čto-clause, object extraction	**1.302e-08**
čtoby-clause, subject extraction, high adverb absent	0.03705
čtoby-clause, subject extraction, high adverb present	0.05392

condition	p-value
čtoby-clause, object extraction	**0.005027**
All filler sentences	0.001843
Grammatical filler sentences	0.05176
Ungrammatical filler sentences	**1.808e-07**

Table 1. Wilcoxon test for comparing judgments from two versions of the experiment

The p-values actually show that the context affects the ratings in certain cases. Namely, it affects the ratings for the object extraction and for the ungrammatical fillers. These results do not align with the claims made in Sprouse (2007), according to which the context does not affect the experimental results at all.

5. Discussion

My results demonstrate that, in Russian, subject extraction is indeed rated lower than object extraction. Thus, my data confirms that Russian also exhibits the complementizer-trace effect, which adds up to the assumptions about the universality of this constraint.

Notably, the difference between the acceptability of subject and object extraction holds for both types of clauses that were examined. This, in turn, contradicts the data of Antonenko (2008, 2010), who claims that subjunctive clauses do not display the complementizer-trace effect due to the structural properties of the complementizer *čtoby* 'that.SUBJ'. In opposition, my experiment suggests that extraction of the subject is affected by a restriction that is not intrinsic to a specific type of clause.

In addition, this study confirms the data in previous papers, according to which there is a difference between indicative and subjunctive embedded clauses with regard to transparency for object extraction (Dyakonova 2009). This result is welcome since it presents valid evidence for the judgments, which are quite subtle. Besides, it fits with Dyakonova's account of the asymmetry in object extraction out of the two embedded clauses. Notably, since Dyakonova does not discuss subject extraction, her theory leaves room for the complementizer-trace effect to be explained by some additional restrictions on the grammar. The assumption about two different factors affecting argument extraction in Russian actually coincides with the empirical data.[6]

Let us consider the relevance of the results of the experiment for the theories of the complementizer-trace effect.

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[6] Here I adopt the weight-constraint approach to interpreting the gradience of the experimental data. According to it, each constraint has its certain value, which combined can generate a range of possible levels of acceptability. Another type of approach, the binary-category one, assumes that sentences can be either grammatical or not. It suggests that the gradience of judgments must be attributed to some non-syntactic constraint. I leave the discussion of whether this kind of explanation can be provided for the data in this paper for the future. For more discussion of approaches to the interpretation of experimental data, see Sprouse (2015).

The experiment has shown that the presence of a high adverb has no effect on the acceptability scores of subject extraction. First, this rules out the accounts based on the assumption that the complementizer-trace effect is due to the ban on the linear adjacency of the complementizer and the extraction site. The presence of a high adverb that is supposed to intervene between the complementizer and the extraction site did not affect participants' judgments. Thus, this result supports the previous claims about the inadequacy of prosodic theories (Toquero-Pérez 2020).

Structural accounts are not that consistent in their predictions. Theories based on the notions of NIC and ECP actually predict the absence of adverb obviation (see Culicover 1993), thus matching with the results of the study; however, they cannot explain the apparent difference between Russian and English. The same considerations apply to the theory in Pesetsky & Torrego (2001), which does not predict adverb obviation to exist either. It is hard to see how the presence of an adverb could affect the properties of the subject and of C and T heads. My results are also unexpected under Erlewine's (2020) anti-locality theory, provided that adverbials in Russian have the same structural properties as adverbials in other languages. One could argue that adverbials in Russian are merged as free adjuncts rather than as a part of a separate projection, thus not being able to prevent the subject movement from being too short. However, the syntax of adverbials is still an open question, as both the cartographic (Cinque 1999) and free adjunction approaches (see Haider 2000; Ernst 2002, a.o.) have their advantages and downsides. The proper examination of the syntax of adverbials in Russian is, however, beyond the scope of the current study, as well as the discussion of the compatibility of Erlewine's approach with the free adjunction view on adverbial syntax.

The Exfoliation theory, on the other side, might provide some insights into the reasons for the cross-linguistics variation. If adverb obviation in English is, in fact, due to the additional adverbial CP above the embedded clause, we actually do not expect the obviation to be possible in Russian since it does not allow for double complementizer structures (27), unlike English (26).

(26) We know [CP that for all intents and purposes [CP that the government created a rating agency oligopoly that prevented the market from enjoying more competition]].

(Pesetsky 2021:(78a))

(27) a. * my znajem čto   faktičeski čto   pravitel'stvo sozdalo oligopoliju
           we know   that   practically that   government   created oligopoly
           'We know that the government has practically created an oligopoly.'
      b. * my xotim   čtoby   faktičeski čtoby   pravitel'stvo sozdalo
           we want   that.SUBJ practically that.SUBJ government   created
           oligopoliju
           oligopoly
           'We want the government to practically create an oligopoly.'

Thus, the results of this study raise certain questions about the adequacy of the existing theories. They also show that adverb obviation is a factor that should be examined further, especially from a crosslinguistic perspective.

6. Conclusion

In this paper, I discuss the experimental study of the complementizer-trace effect in Russian. The results of the experiment provide additional support to the claims about the universality of the complementizer-trace effect. They also suggest that the theories attributing the ungrammaticality of analogous structures to the prohibition on linear adjacency of the complementizer and the extraction site do not hold against the Russian data. In addition, the data raise certain complications for the structural theories. The study also sheds light on the asymmetries between the two types of embedded finite clause in Russian by showing that the empirical data coincides with the data from Dyakonova (2009), thereby validating her ideas about the nature of the differences in object extraction. Finally, I show that the Russian data might provide a counterexample against assumptions in Sprouse (2007) about the insignificance of the presence of the context in the experimental studies.

Acknowledgements

Abbreviations

ACC   accusative
GEN   genitive
NOM   nominative
Q   question particle
SUBJ   subjunctive

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Finnish verbal affix order
When it distorts the Mirror Principle

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In this paper, we investigate Finnish verbal affix order, with a focus on reflexive, causative and passive markers. Our data not only reveal affix cooccurrence restriction and affix interpretation variation, but they also show that Finnish affix order does not fully comply with the Mirror Principle as depicted by Baker (1985) nor with any other existing model. Instead, we propose two different models integrating the Mirror Principle among other morphological and syntactic constraints: an approach based on a stratal application of the Optimality Theory, and an approach using a set of morphosyntactic operations, ruled by a 'specificity' principle.

1. Introduction

Both inflection and derivation are morphological operations during which an affix (or bound morpheme) is added to a stem in order to modify the word's meaning or function in the sentence. On the verb for instance, it is common to observe the presence of affixes expressing morphosyntactic features such as phi-features, tense and aspect, but also valency changing. Valency changing (which concerns all affixes studied in this paper) is the operation which consists of either increasing or decreasing the number of arguments controlled by the verb, or altering their semantic role, thereby modifying the lexical properties of the verb. For instance, one of the most wide-spread operations of valency changing is passive, which puts the object (or patient) of a transitive verb in the position of the subject, and hinders the original subject (or agent), that can then only be expressed obliquely. Since multiple affixes can be combined and added to a stem, one current challenge in morphology is to understand what determines the surface order in which the affixes occur relatively to each other when they are attached one after the other (either before or after the stem).

   The Mirror Principle, introduced by Baker (1985), gives a syntactic explanation of such phenomena: it postulates that the affixes are inserted on the stem following the order of syntactic operations. The syntactic operations, which can be formalized in what is called the logical form, are the operations by which the original meaning of the target item (including sometimes its relationship with the other components of the clause) is modified. When syntactic operations occur one after another, each operation is applied on the result of the preceding one: in other words, it does not target the original item, but the whole new item resulting from the previous operations. Therefore, the scope of each syntactic operation is stated precisely and

unambiguously in the logical form. According to the Mirror Principle, the order of syntactic operations should be mirrored by the surface order of morphemes (or phonological form, as opposed to the logical form). As a consequence, the first meaning inserted should appear closer to the root in the phonological form; and the phonological form should in principle be sufficient to deduce the logical form behind it without any ambiguity.

In the sentences in (1a) and (1b), which come from Bemba (a Bantu language), we can see that two meanings are inserted on the verb root: a reciprocal and a causative. But they are inserted in the reverse order, which leads to different interpretations of the VP. As predicted by Baker's Mirror Principle, the affix order is the same in both the logical and phonological form.

(1)   a. Causativized reciprocal
           Logical form: [[see **RECP**] **CAUS**]
           Naa-mon-**an-ya**   Mwape   na   Mutumba.
           1SG.PAST-see-**RECP-CAUS**   Mwape   and   Mutumba
           'I **made** Mwape and Mutumba see **each other**.'

                                                              (Bemba; Baker 1985:(49))
       b. Reciprocalized causative
           Logical form: [[see **CAUS**] **RECP**]
           Mwape   na   Chilufya   baa-mon-**eshy-ana**   Mutumba.
           Mwape   and   Chilufya   3SG-see-**CAUS-RECP**   Mutumba
           'Mwape and Chilufya **made each other** see Mutumba.'

                                                              (Bemba; Baker 1985:(49))

However, the Mirror Principle does not account for affix order in every language. Hyman (2003) presents data from Chichewa (also a Bantu language) in which the same affix order can express two different syntactic operation orders. Whereas (2a) complies with the Mirror Principle, (2b) shows the same surface order of morphemes for the reverse order of syntactic operations (or scope interpretation). Hyman explains this discrepancy by introducing the idea of a purely morphological template constraining the order in which the affixes are inserted, called the CARP template (for Causative > Applicative > Reciprocal/Reflexive > Passive).

(2)   a. Applicativized causative
           Logical form: [[cry **CAUS**] **APP** *(with sticks)*]
           alenje   a-ku-lil-**fts-il**-a   mwami   ndodo
           hunters   3PL-PROG-cry-**CAUS-APP**-FV   child   sticks
           'The hunters **are making** the child cry **with sticks**.'

                                                              (Chichewa; Hyman 2003:(3))
       b. Causativized applicative
           Logical form: [[stir **APP** *(with a spoon)*] **CAUS**]
           alenje   a-ku-takas-**its-il**-a   mkazi   mthiko
           hunters   3PL-PROG-stir-**CAUS-APP**-FV   woman   spoon
           'The hunters **are making** the woman stir **with a spoon**.'

                                                              (Chichewa; Hyman 2003:(3))

The aim of this paper is to investigate an Uralic language whose affix order has (as far as we know) never been studied. The choice of Finnish has been mainly motivated by the fact that this is known to be an agglutinative language, and therefore favorable to study affix order, and

by the overall number of native speakers (5.5 million—Finnish is the second most spoken Uralic language), which made it easy to find linguistics consultants even outside of Finland for this research project. Based on elicitations and grammaticality judgements provided by four native speakers, we claim that Finnish verbal affix order does not entirely comply with the Mirror Principle nor with the CARP template: instead, we propose two new possible models accounting for it. Both of these models are based on different frameworks, but they have in common to include morphological constraints as well as syntactic constraints. Our goal by proposing two different models is to show how different frameworks can account for complex affix orders (which do not comply with any existing model), even with a limited amount of data available.

In section 2, we present the Finnish verbal affixes under investigation; in section 3 we show what happens when one tries to combine them. Section 4 is dedicated to a short summary of how these combinations defy any existing model, either purely morphological (as the CARP template) or mainly syntactical (as the Mirror Principle). The two following sections are dedicated to the two new models we would like to bring to the reader's attention: section 5 proposes a Stratal Optimality Theory approach where morphology overrules syntax; whereas section 6 proposes a set of morpho-syntactic operations occurring on the morphological and then on the syntactic level, ruled by a 'specificity' principle. Conclusions are drawn in section 7.

2. Finnish verbal affixes

As a rather agglutinative language, Finnish can add morphemes to the verb stem in order to express reflexive (§2.1), passive (§2.2) and causative (§2.3). The description of the following affixes is mainly borrowed from Finnish grammars (Karlsson 2017; Sulkala 2013).

2.1. Reflexive

Reflexive indicates that the two first arguments of the verb (i.e. the subject, or agent, and the direct object, or patient) are the same, thereby decreasing the verb valency. As such, the reflexive affix can only be applied on transitive verbs (that become intransitive after the insertion of the reflexive affix). In some cases, the reflexive affix can also modify further the lexical interpretation of the verb and give it a new meaning (see (4)).[1]

Finnish reflexive takes the forms of *-U*, *-UtU* or lengthening of the preceding vowel plus *-ntU*, where *U* is realized as either *u* or *y* depending on the frontness of the vowel in the last syllable of the stem with *y* for front vowels (3b) and *u* for back vowels (4b).

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[1] Finnish used to have a reciprocal affix, which in some cases also modified the lexical interpretation of the verb. It seems that this affix is not used anymore in the Finnish grammar, but it can still be found in the etymology of some words, such as:

(i) a. tappa-a   b. tap-ell-a
         kill-1INF   kill-RECP-1INF
         'to kill' *(tr.)*   'to fight' *(intr.)*
(ii) a. rakasta-a   b. rakast-ell-a
         love-1INF   love-RECP-1INF
         'to love' *(tr.)*   'to make love' *(intr.)*

As constrained by the original affix, the resulting verbs are always intransitive (and coming from transitive verbs).

(3)   a. kehittä-ä   b. kehitt-**y**-ä
         develop-1INF   develop-**REFL**-1INF
         'to develop' *(tr.)*   'to develop (oneself)' *(intr.)*

(4)   a. anta-a   b. anta-**utu**-a
         give-1INF   give-**REFL**-1INF
         'to give' *(tr.)*   'to surrender' *(intr.)*

2.2. Passive

Passive changes the voice of the verb by indicating that the patient (or direct object of the verb in active voice) is the subject. Like the reflexive affix, the passive one can only be applied on transitive verbs, and it makes them intransitive, thereby decreasing the verb valency.

Finnish passive marker has the form *-Vn* and always follows the tense marker *-(t)tA* for present (5a) or *-(t)ti* for past (5d), where *V* represents a repetition of the preceding vowel and *A* the frontness vowel harmony realized as *ä* for front vowels and *a* for back vowels.

(5)   a. laul-a-a   b. laul**e-taan**
         sing-PRS-3SG   sing-**PRS.PASS**
         'sings'   'is sung'
       c. laul-oi-Ø   d. laul**e-ttiin**
         sing-IMPF-3SG   sing-**IMPF.PASS**
         'sang'   'was sung'

Note that the passive form of a Finnish verb is unipersonal, that is, it does not agree with the subject in person and number. In other words, there is only one passive form for each verb in each tense. This morphological property along with some others has been pointed out by Shore (1988) as an argument against the existence of a Finnish passive: Shore claims that the construction presented above should not be considered as a true passive, but rather as an 'indefinite' or 'impersonal' form. However, Manninen & Nelson (2004) argue that PASS used to be accompanied by some personal agreement form and is still accompanied by such a form in cases that prescriptive grammarians qualify as 'hypercorrections'. This should be sufficient to prove that the lack of personal agreement (overt markers) is not an intrinsic property of the Finnish passive, and thereby to discard Shore's argument. Even though the Finnish passive does not show the exact same morphosyntactic properties as English or Latin ones, there is no reason not to consider it as a true passive. We will therefore consider the markers presented in (5) as denoting a true passive (as well as tense and aspect) in our further analyses.

2.3. Causative

Causative indicates that the subject of the verb is not the agent anymore, but the entity which causes the action (or state) to happen. The agent (as well as the patient if there is one) is moved and becomes the direct or indirect object of the verb. Contrary to reflexive and passive, causative increases the valency of the verb, and it can be applied on both transitive and

intransitive verbs, always resulting in a transitive verb. The interpretation of the causative affix and its relation with the agent and patient (if applicable) of the action will be discussed further in our empirical data (see §3.2.).[2]

Finnish causative verbs can be formed by attaching one of the following suffixes to the stem: *-tA*, *-ttA*, *-UttA*, *-hdUttA* (see (6)). Again, *A* and *U* represent either *ä* or *a* and either *ü* or *u* respectively depending on the frontness of the previous vowel sound.

(6) a. herät-ä
          awake-1INF
          'to awake' *(intr.)*

 b. herä-**ttä**-ä
          awake-**CAUS**-1INF
          'to wake up' *(tr.)*

3. Empirical data

In this section, we present how Finnish expresses different combinations of these meanings, each time with one order and then the reverse one: reflexive and causative and vice-versa (§3.1), passive and causative and vice-versa (§3.2), and passive, causative and reflexive, or reflexive, causative and passive (§3.3). Due to the valency-changing and semantic nature of reflexive and passive, these two affixes cannot be combined except when there is a causative in between.

Our initial prediction is that for each combination, all affixes should be inserted following the Mirror Principle, the first meaning being closer to the stem: as we will see, this prediction is only realized in half of the data that we collected.

These data come from sessions of elicitations and grammaticality judgements with four native speakers of Finnish recruited online. Each informant was interviewed alone, and each item (elicitation or grammaticality judgement) was presented to at least two of them in order to ensure that the outcomes overlapped from one speaker to another. Each meaning or affix combination was tested with multiple verbs (most of them coming from our grammars to allow for a double-check), which were chosen for their valency and lexical properties. The elicitations and grammaticality judgements were always presented with a context to make sure that their sometimes difficult-to-process meanings were understood by the informants. Since the causative affix was not spontaneously used by our native speakers (who preferred to use the periphrastic verb *pakottaa* 'to cause to do'), we made sure to provide them one example from a Finnish grammar (see (6a) and (6b)), so that they knew how they were expected to express the causative meaning. All data presented below are either elicitations from our native speakers, or sentences created by us based on the elicitations and judged for their grammaticality (and sometimes naturalness) by the aforementioned native speakers.

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[2] In some very precise cases, the causative affix can also have an additional meaning, such as 'to feel like', see:

(i) a. aivastu-a
          sneeze-INF
          'to sneeze'

 b. aivastu-tt-a
          sneeze-CAUS-INF
          'to make (someone) sneeze' *(tr.)*
          or 'to feel like sneezing' *(intr.)*

However, this meaning is not relevant to the current study, and we will not discuss it further.

3.1. Reflexive and causative combinations

It is possible to express a causativized reflexive through affixes inserted on the verb, as (7) demonstrates: the affixes follow exactly the order of syntactic operations. The resulting sentence is unambiguous and cannot be interpreted as a reflexivized causative, which is in line with the Mirror Principle.

(7)   Causativized reflexive
       Logical form: [[verb **REFL**] **CAUS**]
       Irmeli   uhra-**udu-tt**-i   Meeri-n.
       Irmeli   sacrifice-**REFL-CAUS**-IMPF.3SG   Meeri-ACC
       'Irmeli **made** Meeri sacrifice **herself**.'
       *'Irmeli **made herself** sacrifice Meeri.'

However, the reverse meaning (reflexivized causative) is trickier: it is apparently not possible to insert the two affixes in the logical order, as we can see in (8a). Plus, as we said above, (7) could not be interpreted as a reflexivized causative. Whereas it is possible to insert a causative on the verb, it seems that the reflexive affix cannot be inserted after the causative: it has therefore to be inserted through an external pronoun, as in (8b). The affix order CAUS-REFL is strictly ungrammatical, regardless of the verb on which it is inserted.[3]

(8)   Reflexivized causative
       Logical form: [[verb **CAUS**] **REFL**]
       a.*Tuomas laula-**tt-udu**-i
          Tuomas sing-**CAUS-REFL**-IMPF.3SG
          int. 'Tuomas **made himself** sing.'
       b. Tuomas laula-**tt**-i   **itseä**-än.
          Tuomas sing-**CAUS**-IMPF.3SG   **oneself**-PAR
          'Tuomas **made himself** sing.'

3.2. Passive and causative combinations

Passivized causative is expressed as predicted by the Mirror Principle, with the affixes inserted in the order of syntactical operations on the verb, as we can see in (9a). Again, the resulting sentence is unambiguous, and it would not be possible to interpret it as a causativized passive, even if an accusative was added to the sentence, as in (9b).

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[3] The partitive in the example is due to the fact that *laulaa* is a 'partitive verb': its agent must be expressed with the partitive case (instead of the nominative or genitive). This does not affect our data, as the verb otherwise displays the same behavior with affixes as other verbs.

(9) Passivized causative
Logical form: [[verb **CAUS**] **PASS**]
    a. Tuomas laula-**te-ttiin**.
       Tuomas sing-**CAUS-PASS**.IMPF
       'Tuomas **was made** sing.'
    b.*Tuomas laula-**te-ttiin**   laulu-n.
       Tuomas sing-**CAUS-PASS**.IMPF   song-ACC
       int. 'Tuomas **made** a song **be sung**.'

However, the reverse meaning (causativized passive) cannot be expressed through the insertion of the respective affixes (passive, then causative), as we can see in (10a). When asked to produce this meaning, all native speakers produce a sentence in which only the causative is expressed, as observed in (10b). Even more surprisingly, this sentence appears to be strictly unambiguous, and the verb cannot be interpreted as if it contained only a causative.

(10) Causativized passive
Logical form: [[verb **PASS**] **CAUS**]
    a.*Meeri   pelast-**ttiin-utta**   Tuomas-in.
       Meeri   save-**PASS.IMPF-CAUS** Tuomas-ACC
       int. 'Meeri **had** Tuomas **saved**.'
    b. Meeri   pelast-**utt**-i   Tuomas-in.
       Meeri   save-**CAUS**-IMPF.3SG   Tuomas-ACC
       'Meeri **had** Tuomas **saved**.'
       *'Meeri **had** Tuomas **save**… (someone).'

Investigating this puzzle further, we found that when a causative is applied on a transitive verb, it has a curative (or 'causativized passive') meaning, implying that the object is the patient (not the agent) of the action. By comparing (11a) and (11b), we can see that the complement of the verb (in accusative) can therefore only be a patient: every other interpretation of its function is not correct. The agent does not have to be indicated, but it can be inserted obliquely, through the adessive case (which, in this situation, expresses that the entity is associated with the action).[4,5]

(11) a. Pauli kirjoit-**utt**-i   kirje-en   (Tuoma-ksella).
       Pauli write-**CAUS**-IMPF.3SG letter-ACC (Tuomas-ADE)
       'Pauli **had** a letter **written** (by Tuomas).'
    b.*Pauli kirjoit-**utt**-i   Meeri-n.
       Pauli write-**CAUS**-IMPF.3SG Meeri-ACC
       int. 'Pauli **made** Meeri **write**.'

The curative meaning of the so-called affix CAUS also explains (12), in which we can find CAUS and PASS inserted in that order, but the resulting sentence expresses a passive, a

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    [4] Regarding the example (11a), please note that adessive can also express a location: one other interpretation of this sentence, although more unlikely, could be 'Pauli had a letter written at Tuomas' place.'
    [5] *Pauli kirjoitutti Meerin* could actually be correct if *Meeri* was for instance the title of a book (and Pauli a publisher?), but it would then be translated as such: 'Pauli had *Meeri* written.' The point is that Meeri cannot be a person nor an agent there.

causative and another passive. In other words, when used for its curative meaning (i.e. with a transitive verb), the CAUS marker alone can convey the meaning of both the first passive and the causative.

(12)   Passivized curative (or passivized causativized passive)
       Logical form: [[[write **PASS**] **CAUS**] **PASS**]
       Kirje   kirjoit-**ute-ttiin**.
       Letter   write-**CAUS-PASS**.IMPF
       'A letter **was ordered** to **be written**.'

3.3. Reflexive, passive and causative combinations

Since it was technically possible to combine reflexive and passive if there was a causative in between, we decided to study cases in which these three meanings had to be combined: the resulting sentences are in line with the constructions observed in §3.1 and §3.2.

In (13), as in (7) and (9a), the affixes are inserted following the order of syntactical operations (and therefore the Mirror Principle): there is no problem with the insertion of causative after reflexive, nor with the insertion of passive after reflexive. The resulting sentence is entirely unambiguous.[6]

(13)   Passivized causativized reflexive
       Logical form: [[[verb **REFL**] **CAUS**] **PASS**]
       ?Tuomas anta-**udu-te-ttiin**.
       Tuomas give-**REFL-CAUS-PASS**.IMPF
       'Tuomas **was made surrender**.'

In (14), we encounter the same puzzles as those raised by (8) and (10). First, the causative affix has a curative interpretation and seems to be enough to convey the [[PASS] CAUS] meaning. Second, it is not possible to insert the reflexive affix after the causative one, which results in the reflexive meaning inserted through an external pronoun again.

(14)   Reflexivized causativized passive
       Logical form: [[[verb **PASS**] **CAUS**] **REFL**]
       Tuomas pelast-**utt**-i   **itse**-nsä   Marketa-lla.
       Tuomas save-**CAUS**-IMPF.3SG   **oneself**-GEN   Marketta-ADE
       'Tuomas **had himself saved** by Marketta.'

---

[6] Although this sentence was said to be theoretically perfectly grammatical by our native speakers, the accumulation of affixes made it seem strange and unnatural to them. This is partly due to the fact that they are more used to expressing causative with a subordinating verb (*pakottaa* 'to cause to do') than with an affix, and would spontaneously always choose the verb over the affix. They are therefore not used to combine this affix with another affix (and even less used to combine it with several other affixes), and none of them produced this sentence spontaneously, even though they recognized that there was no reason to consider it unacceptable. It seems that with time, Finnish tends to be less of an agglutinative language and more analytical: for instance, our native speakers also reported that the external reflexive pronoun was overall more used by young people than the reflexive affix.

4. Preliminary analysis

Whereas some surface affix orders seem to follow exactly the Mirror Principle, the reverse underlying affix orders always challenge it by ruling out an affix. The table in (15) summarizes the results produced by each combination.

(15)   Affix orders summary

[[REFL] CAUS] *complies with the Mirror Principle*	**[[CAUS] REFL]** REFL has to be expressed outside the verb
[[PASS] CAUS] PASS is expressed through CAUS	**[[CAUS] PASS]** *complies with the Mirror Principle*

As we already stated, the causative affix seems to have two possible interpretations, which are constrained by the valency or transitivity of the verb: whereas intransitive verbs raise a causative interpretation (with the accusative directly following the verb interpreted as the agent), transitive verbs raise a curative interpretation (with the accusative directly following the verb interpreted as the patient). This explanation should be sufficient to account for the absence of passive affix in [[PASS] CAUS].

As for the reflexive affix, the reason why it cannot be inserted on the verb when a causative affix is already inserted (whereas it is possible to insert it before a causative affix) is not clear to us. However, when the reflexive meaning is not expressed through an affix, it has to be expressed in another way: which is why it results in an external pronoun. The realization of reflexiveness takes place on the syntactical level instead of the morphological one.

Although these data only partially comply with the Mirror Principle, they do not comply with the CARP template either, as proved by the causativized reflexive ([[REFL] CAUS]). Furthermore, none of the sentences produced are ambiguous: this suggests that Finnish affix order is not arbitrarily fixed, but rather obeys to some morphosyntactic rules constraining the way meanings are realized one after the other. This raises the need to find a new model to account for it: in the two following sections, we present two different models which could predict the affix order we found. In §5, we present a Stratal Optimality Theory approach in which morphology overrules syntax, whereas in §6, we present a set of morphosyntactic operations occurring on the morphological and then syntactical level, ruled by a principle of marker specificity.

5. A Stratal Optimality Theory approach

In this section, we propose a modelization of the Finnish affix order data within the framework of Stratal Optimality Theory (Stratal OT henceforth) to realize our approach of morphology overruling syntax. Stratal OT provides a way to model both opacity and cyclicity in various types of data, while maintaining the traditional constraint-based modelization of Optimality Theory (Prince & Smolensky 1993, 2004). This is done by relating a certain set of constraint operations only to the size of the relevant domain, but not to that of the others which are subject to different constraint operations. We will argue that there are two strata in Finnish verbal

morphology, a stem level and a word level, and the observed discrepancies in Finnish affix order from the default orders dictated by the Mirror Principle result from a morphological constraint overriding the default syntactic constraint at each level. The crucial point is that the higher ranked morphological constraints are only assigned to their respective ranking positions with respect to the syntactic constraint in their own level while remaining oblivious to any operations at the other level, thus yielding the observed surface affix order.

5.1. Stratal Optimality Theory

Stratal OT is a modified version of the traditional OT in that it allows for layered evaluation instead of the entirely parallel one in the old approach (Kiparsky 2000, 2015; Bermúdez-Otero 2018; Benz 2019, among others). Compared to the traditional OT, Stratal OT is able to model opaque or cyclic processes by introducing a chain of strata, each of which has its own constraint ranking. This makes it possible that constraint rankings of different strata are distinct from each other and can operate independently without interfering in the evaluation of others. At the same time, the different strata are not completely insulated from each other, as the output of an upper stratum is usually fed into a lower stratum as input so that information flows and gets modified from one stratum to another just like on an assembly line.

For the present analysis of Finnish verbal affix order, we assume two strata of morphology: the stem level, where the derivational suffixes including reflexive and causative are attached to the verbal root, and the word level, where other inflectional suffixes such as tense/person marker and passive are added. The assignment of derivational and inflectional affixes into two separate strata is motivated by their distinct morphological functionalities, but also finds support in semantics, since it obeys the degree of relatedness proposed by Bybee (1985) based on a typological survey of 50 languages. According to Bybee's proposal, affixes semantically more relevant to the stem should be closer to the stem. Thus, it follows that affixes concerning valency, i.e. the capacity of a verb to take a specific number and type of arguments, should find themselves in close proximity to the stem, while inflectional affixes denoting voice, aspect, tense, mood or agreement should be positioned further apart from the stem. Specifically, for the Finnish verbal affixes under investigation, reflexive and causative belong to the first group, as the former reduces the valency of the verb by one (from transitive to intransitive) and the latter raises it by one (from transitive to ditransitive); while tense/person marker and passive belong to the second group.

5.2. Stratum 1: stem level

The present modelization assumes that reflexive (REFL) and causative (CAUS) are the two suffixes that belong to the stem level morphology. According to the Mirror Principle (Baker 1985), affix order should reflect the exact sequence of syntactic operations applied, which takes form of the following faithfulness constraint:

(16) IDENT(S)$_{stem}$
      Assign one violation for every alteration to the affix order dictated by the sequence of syntactic operations at the stem level.

This constraint dictates that the resulting surface affix order of a sequence of two syntactic operations with the the first being attaching the reflexive suffix to the verbal root and the second the causative can only be verb-reflexive-causative. The input and output can be formally represented as follows:

(17)   underlying form: [[verb REFL] CAUS] → surface form: verb-REFL-CAUS

The table in (18) demonstrates how IDENT(S)$_{stem}$ can produce the correct surface affix order for the stem level morphology in example (7):

(18)

[[give REFL] CAUS]	IDENT(S)$_{stem}$
☞ a. give-REFL-CAUS	
b. give-CAUS-REFL	*!

Candidate a in (18) wins out, as it obeys the Mirror Principle by attaching the suffixes in the order of the corresponding syntactic operations, thus not violating the faithfulness constraint. Candidate b, on the other hand, includes one alteration of the syntactic order by adding the causative marker before the reflexive to the verbal root, which violates the Mirror Principle and is ruled out by the faithfulness constraint accordingly.

However, the faithfulness constraint alone fails to generate the correct surface form when the order of the syntactic operations is reversed, in other words, attaching the causative suffix first, then the reflexive. Consider example (8b), where the underlying logical form is [[verb CAUS] REFL], but the surface form does not include reflexive as a verbal suffix; instead, reflexive is expressed using a separate reflexive pronoun *itseään* outside of the verbal complex, yielding an unexpected affix order verb-CAUS#REFL. Crucially, when the reflexive is forced upon the stem, appearing immediately after the causative suffix as verb-CAUS-REFL, it would result in ungrammaticality as shown in (8a). Yet our present constraint ranking with a single faithfulness constraint clearly is not able to capture this.

(19)

[[sing CAUS] ...] REFL	IDENT(S)$_{stem}$
? a. sing-CAUS-REFL	
b. sing-REFL-CAUS	*!
? c. sing-CAUS#REFL	

The table in (19) illustrates that even though the affix order against the Mirror Principle as represented by candidate b is correctly ruled out by the faithfulness constraint, we are still left with two potential winners. The data provides evidence for candidate c as the true winner, while disapproving candidate a. It seems that, compared to candidate c, candidate a is more marked

because of having causative directly followed by another suffix. Since it is fine for causative to be preceded by reflexive as shown in (7), it should not be the case that causative entirely forbids reflexive to appear in its vicinity. Therefore, we are safe to conclude that Finnish prefers causative to be the last element attached to the verbal root at the stem level. To incorporate this preference in our constraint ranking, we need a markedness constraint as introduced in (20) and let it overrank the current faithfulness constraint as laid out in (21):

(20) CAUS-R
      Assign one violation for every morpheme intervening between the right edge of the causative suffix and the right edge of the stem.

(21) Stem level constraint ranking (preliminary)
      CAUS-R ≫ IDENT(S)$_{stem}$

Given that reflexive is also modelled to be a stem level suffix same as causative, it naturally follows that reflexive should be similarly assigned with a markedness constraint. The only difference is that, unlike CAUS-R, it must be ranked lower than the faithfulness constraint to reflect the data that reflexive always follows the order dictated by syntax. This gives us REFL-R, which is defined below:

(22) REFL-R
      Assign one violation for every morpheme intervening between the right edge of the reflexive suffix and the right edge of the stem.

And now we arrive at the final version of the constraint ranking for the stem level and its output:

(23) Stem level constraint ranking (final)
      CAUS-R ≫ IDENT(S)$_{stem}$ ≫ REFL-R

(24)

[[sing CAUS] ...] REFL	CAUS-R	IDENT(S)$_{stem}$	REFL-R
a. sing-CAUS-REFL	*!		
b. sing-REFL-CAUS		*!	*
☞ c. sing-CAUS#REFL			

Comparing the tables in (19) and (24), we see that candidate a is ruled out even before candidate b, since it is punished by the highest ranked CAUS-R. This leaves us with candidate c, which is exactly the surface affix order we observed in the data in (8b).

5.3. Stratum 2: word level

For the present analysis, the word level morphology mainly concerns the order of the passive (PASS) and the tense/person marker (TP) with respect to other morphemes. Similar to the stem level morphology, we propose a faithfulness constraint to embody the default affix order governed by the Mirror Principle. To differentiate it from its counterpart at the stem level, we use the subscript word:

(25) IDENT(S)$_{word}$
Assign one violation for every alteration to the affix order dictated by the sequence of syntactic operations at the word level.

Likewise, two markedness constraints can be introduced for PASS and TP, punishing every interfering morpheme between them and the right edge of the word level:

(26) PASS-R
Assign one violation for every morpheme intervening between the right edge of the passive suffix and the right edge of the word.

(27) TP-R
Assign one violation for every morpheme intervening between the right edge of the tense/person marker and the right edge of the word.

Since the passive form of Finnish verbs always have TP followed by PASS (see §2.2), the PASS-R constraint must be ranked higher than TP-R. For the time being, we are still ignorant about the relative ranking of PASS-R with respect to the faithfulness constraint, so we denote it tentatively as non-crucial:

(28) Word level constraint ranking (preliminary)
IDENT(S)$_{word}$, PASS-R ≫ TP-R

With this preliminary constraint ranking, it is already possible to produce surface forms that strictly follow the Mirror Principle as the one in (9a):

(29)

[[sing CAUS] PASS]	IDENT(S)$_{word}$	PASS-R	TP-R
☞ a. stem(CAUS)-TP-PASS			
b. stem(CAUS)-PASS-TP		*!	

Note that a candidate with the surface form stem-PASS-CAUS-TP or stem-PASS-TP-CAUS is not considered as valid in our present analysis, since causative by definition is a stem level suffix, and thus cannot be moved out of the stem and attached after PASS and TP at the word level. An alternative candidate, however, is one with no passive marker at all, as what we have seen in example (10a) and (11a):

(30)

[[sing CAUS] PASS]	IDENT(S)$_{word}$	PASS-R	TP-R
? a. stem(CAUS)-TP-PASS			
? b. stem(CAUS)-TP			

The table in (30) demonstrates that our current constraint set cannot rule out this alternative. To do this, we need another faithfulness constraint that prohibits the deletion of the passive marker:

(31) MAX(PASS)
      Assign one violation for the deletion of the passive suffix from the input.

Again, at this point, we do not know the relative position of MAX(PASS) in the constraint ranking. But by simply including MAX(PASS) in the ranking, we can already arrive at the grammatical output, as it reduces candidate b due to its lack of the passive marker:

(32)

[[sing CAUS] PASS]	IDENT(S)$_{word}$	PASS-R	MAX(PASS)	TP-R
☞ a. stem(CAUS)-TP-PASS				
b. stem(CAUS)-TP			*!	

Nevertheless, a parallel relation between IDENT(S)$_{word}$ and MAX(PASS) would not generate the surface forms in (10a) and (11a) as displayed in (33):

(33)

[[write PASS] CAUS]	IDENT(S)$_{word}$	PASS-R	MAX(PASS)	TP-R
? a. stem(CAUS)-TP-PASS	*!			
? b. stem(CAUS)-TP			*!	

Candidate a violates IDENT(S)$_{word}$ for altering the default affix order enforced by the syntactic operations, since as a stem level suffix causative can never appear after passive. On the other hand, candidate b is punished by MAX(PASS), because it deletes the passive marker. Consequently, we are left with two equally bad candidates. However, the data suggest that candidate b should be the winner. Hence, MAX(PASS) has to be lower ranked than the faithfulness constraint IDENT(S)$_{word}$ in order to ensure that the violation of candidate b is less worse than that of candidate a. This gives us the final version of the constraint ranking for the word level morphology:

(34)   Word level constraint ranking (final)
       IDENT(S)word, PASS-R ≫ MAX(PASS), TP-R

And this will indeed yield the grammatical surface affix order we observed in (10a) and (11a):

(35)

[[write PASS] CAUS]	IDENT(S)$_{word}$	PASS-R	MAX(PASS)	TP-R
a. stem(CAUS)-TP-PASS	*!			
☞ b. stem(CAUS)-TP			*	

The proposed word level constraint ranking is also able to handle complex affix sequences, such as the ones in Section 3.3., where up to three suffixes participate in the formation of a single verbal complex. The crucial point is the relay between the two levels of morphology, where the output affix order of the stem level directly enters the word level as part of its input without being subject to further alterations. The tables in (36) demonstrate how the interplay between the two levels of morphology will generate the surface form in (14):

(36)

[[save CAUS] ...] REFL	CAUS-R	IDENT(S)$_{stem}$	REFL-R
a. save-CAUS-REFL	*!		
b. save-REFL-CAUS		*!	*
☞ c. save-CAUS#REFL			

Stem level

↓

[[[save PASS] CAUS] REFL]	IDENT(S)$_{word}$	PASS-R	MAX(PASS)	TP-R
a. stem(CAUS)-TP-PASS#REFL	*!			
☞ b. stem(CAUS)-TP#REFL			*	

Word level

In the table for the stem level morphology the output includes causative to be an internal element of the stem, while leaving reflexive as an external element lying outside of the predicate. This becomes the input of the word level morphology, so that all the candidates at

this level maintain the predetermined structure of causative and reflexive, while making arrangements with the passive and tense/person markers only.

6. A set of morphosyntactic operations ruled by a 'specificity' principle

In this section, we propose an alternative model accounting for the Finnish verbal affix order, which does not make use of the Stratal OT theory but rather of a set of successive morphosyntactic operations.

In this model, all meanings are inserted following the order of syntactic operations (as predicted by the Mirror Principle), first on the morphological level, and then on the syntactical level if this is necessary (for the remaining meanings):

(37)   Stratal set of operations
  a. At the morphological level:
   Insertion of meanings that can be inserted
  b. At the syntactical level:
   Insertion of the meaning that could not be inserted on the previous level

However, meaning insertion is also constrained by the affixes' morphological properties (see §6.1.) and most of all by what we call the 'specificity' principle (see §6.2.).

6.1. At the morphological level: morpheme cooccurrence restriction

First, the meanings should be inserted (following the order of syntactical operations, as called by the Mirror Principle) on the morphological level if their morphological properties allow it. Here, we can identify one constraint raising from our empirical data (expressed in two different ways in (38a) and (38b)):

(38)   a. REFL cannot follow CAUS.
  b. *C-selection:* REFL [*VERB-CAUS, uVERB-REFL]

The reason behind this constraint is not clear to us and would deserve further investigation: however, a few hypotheses could be raised. This could be due to some phonological incompatibility between the two affixes in this particular order, for instance.[7] This could also be explained by another unknown purely morphological template similar to the CARP template, but applicable to Uralic languages. Finally, our favorite hypothesis relies on semantics, with the support of the degree of relatedness theory proposed by Bybee (1985): REFL could be considered as semantically more closely related to the verbal stem than CAUS is. As a matter of fact, REFL can significantly change the meaning of the word (see (4a) and (4b)), as the reciprocal affix used to do (see note 1), whereas CAUS only adds an argument to the verb, or

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[7] Although we did not have the opportunity to look at it, it is possible that the affixes change the word stress position, for instance. We would then encounter the same kind of incompatibility as the one depicted by Siegler (1974) in English: some suffixes belong to a 'class I' and trigger some phonological processes (i.e. they attract the stress) whereas the others belong to a 'class II' and do not trigger them. All class I suffixes should be inserted before the others, for the sake of the phonological harmony of the resulting word.

in most extreme cases affects the mood of the verb (see note 2). This slight semantic difference could then explain why the two affixes are treated differently within the Finnish morphology, and why CAUS cannot appear closer to the stem than REFL.

In any case, we can observe a c-selection effect (as expressed in (38b)), where the affix REFL can combine with the verb stem as long as CAUS has not been already inserted on it. This is the only morpheme cooccurrence restriction (or marker blocking effect) discovered in our empirical data, but we do not exclude the possibility that further investigation might find other morpheme cooccurrence restrictions with other affixes.

6.2. At the morphological and syntactical level: the 'specificity' principle

Inspired by the work on Distributed Morphology made by Henze & Zimmermann (2010, 2011), we would like to introduce a principle ruling the marker insertion:

(39)   The specificity principle
     a. Each meaning should be inserted through the most specific marker.
     b. After insertion, the meaning is discharged, and cannot be inserted again.
     c. All meanings should be inserted at a level or another.

For instance, rule (39a) would give the following result, if applied on a causativized passive:

(40)   Causativized passive:
     Logical form: [[**PASS**] **CAUS**]]
     a. Competing markers:
       [PASS] ↔ +PASS
       [CAUS] ↔ +CAUS; +[PASS]CAUS
     b. Most specific marker:
       [CAUS], since it expresses more corresponding features

In this example, we want to express a causativized passive, which means that we would theoretically need to insert markers to express PASS and then CAUS. Two markers bear these features: the PASS marker, and the CAUS marker. But the PASS marker only bears one feature (PASS), which means that if it was chosen, we would still need to insert another feature. Meanwhile, the CAUS marker can bear two features, in the exact logical order in which we need them: it is therefore more specific in the sense that it specifies more features at once.

Following this example, rule (39b) would also explain why after the insertion of CAUS, it would not be possible to find PASS again (since the passive meaning would have been discharged by CAUS), unless there was a second passive meaning to insert.

After the morphological insertion of all possible meanings following the order of syntactical operation, it is still possible to find remaining meanings, which have not been inserted due to the morpheme cooccurrence restriction or c-selection effect depicted in (38): since they could not be inserted on the morphological level, they should be inserted on the syntactical level in order to comply with rule (39c). This is why in example (8), duplicated below for the reader's comfort in (41), the reflexive meaning (which is prevented from being inserted on the verb after CAUS) is inserted through an external pronoun.

(41) Reflexivized causative
     Logical form: [[verb **CAUS**] **REFL**]
     Tuomas laula-**tt**-i   **itseä**-än.
     Tuomas sing-**CAUS**-IMPF.3SG **oneself**-PAR
     'Tuomas **made himself** sing.'

6.3. Summary of the model

To summarize, in this model we claim that the meaning insertion follows three principles, hierarchised as in (42).

(42) Morpheme cooccurrence restrictions ≫ Specificity principle ≫ Mirror Principle

Meanings are inserted: i) following the Mirror Principle; ii) with the most specific markers and only once; and iii) on the morphological level, if they are not prevented from it by any morpheme cooccurrence restriction. If such phenomena happen, the specificity principle needs them to be inserted on the syntactical level.

The specificity principle as we depicted it gives the assurance that Finnish morphology is always the most efficient in expressing what it wants to express (while complying with any existing morphological constraint and applying its operations following a logical order). Here, it seems that the purpose of the syntactical level is mainly to repair the morphology's failure to express a meaning.

7. Conclusion

In this paper, we have investigated Finnish verbal affix order, and especially how the reflexive, causative and passive affixes could be combined or not (and if not, how to produce the targeted meaning combination). This led us to discover that the causative affix could only be combined with the reflexive one when it was inserted after it on the verb stem, and not the other way around; and that its interpretation changed depending on the valency or transitivity of the verb. Most of all, our data showed that Finnish verbal affix order does not comply with the Mirror Principle nor with any other existing model.

But exceptions to the Mirror Principle only take place in precise situations, which makes us think that any relevant modelization of the Finnish affix order should not overrule it but integrate it among other morphological and syntactical constraints. Following this idea, we proposed two different models in the two last sections of this paper: an approach based on a stratal application of the Optimality Theory, and an approach using a set of morphosyntactic operations, ruled by a 'specificity' principle. In both of these approaches, the meanings can be realized on different levels, which are not simultaneous. While the approach depicted in §5 prioritizes morphology over syntax, the approach depicted in §6 uses the syntactical level to compensate for the morphological constraints. Both approaches have been successful in accounting for affix order constraints in other languages: the Stratal OT approach for Washo affix order (Benz 2019) and the specificity principle for Potowatomi (Henze & Zimmermann 2010).

However, with regard to the current Finnish data, neither of the two is 100% satisfying: the specificity principle approach is potentially problematic in that it relies on the assumption that the causative marker is multifunctional (can express both causative and passive), thus more 'specific' compared to the passive marker. But the absence of the passive marker might be the consequence of an Economy Principle instead. This could perhaps be verified by a supralinguistic survey. The Stratal OT approach on the other hand circumvents this issue by having the MAX(PASS) lower-ranked, thus its violation does not result in candidate exclusion. However, it does not provide an account of why the reflexive marker cannot be similarly omitted when following the causative marker but must be inserted outside of the verbal complex (unlike what the specificity principle explicitly dictates). Furthermore, the stratal OT approach relies heavily on the division of the various suffixes into two separate levels, but if there exists an affix that interacts with affixes of both levels, then the division might not be valid anymore. This needs to be consolidated by including more verbal affixes in future research.

Even though the current data do not enable us to choose one approach over the other, they raise the importance of further investigating the Finnish morphology in order to get to a better understanding of what principles lie behind it, and hopefully someday refine or even unify these approaches.

Abbreviations

1	first person	MAX	maximal
3	third person	PRS	present
1INF	first infinitive	PAR	partitive
ACC	accusative	PASS	passive
ACT	active	PERSON	person
ADE	adessive	PL	plural
CAUS	causative	POS	possessive
GEN	genitive	R	right-edge
FV	final vowel	RECP	reciprocal
IDENT	identical	REFL	reflexive
ILL	illative	SG	singular

IMPF	imperfect	TENSE	tense
INF	infinitive	TP	tense-person

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Restricted number and stubborn dative
Long-distance agreement across Basque nominalised complement clauses

Iva Kovač

In varieties of Basque, objects embedded into absolutive- and dative-marked nominalised complement clauses can enter a long-distance agreement relation with the matrix auxiliary. The observed patterns are derived from the featural specifications and probing characteristics of different types of matrix probes: absolutive clauses appear opaquer because they are targeted by a person and a number probe, the former restricting the range of possible goals for the latter, while dative clauses seem more transparent because they are targeted by an integral probe, which, as a consequence of its integrity, is 'stubborn', and able to penetrate domains inaccessible to single-feature absolutive probes.

1. Introduction

Among the strategies employed in Basque infinitival complementation, nominalisation figures very prominently. For a subset of Basque speakers, nominalised complement clauses that are headed by a definite determiner and marked for case show selective transparency for long-distance agreement (Etxepare 2006). Example (1) illustrates this for a dative-marked clause: the clause itself triggers dative agreement on the matrix auxiliary (indicated in boldface), and the embedded object contributes its number features (boxed).

(1)   Uko   egin d-i-☐e☐-Ø   [☐kalteordainak☐ eska-tze-a-**ri**].
        refusal do   3.ABS-AUX-☐3PL☐.**DAT**-3SG.ERG ☐damage.PL.ABS☐ ask.for-NMS-DET-**DAT**
        'He/she refused to pay damages.'   (Etxepare 2006:(2b))

As will be shown below, the extent to which long-distance agreement is possible depends on two main factors: the case of the nominalised clause and the case, structural position, and featural specifications of the embedded object. The present analysis derives the observed patterns from the interplay between the matrix probes and the structures involved. Taking as a starting point the assumption that probes can discriminate between their putative goals on the basis of

phi-features (Béjar 2003) and case (Preminger 2014), it is proposed that absolutive agreement in Basque is a result of separate probes for person and number, which are specified to look for participant and plural features, respectively (Béjar & Řezáč 2009; Preminger 2009, 2011), and that dative agreement arises by virtue of an integral probe lacking any featural specifications. In addition, the range of possible goals of the absolutive number probe is assumed to be restricted by the nature of the argument targeted by the person probe, and the dative probe, as a consequence of probing for both person and number at the same time, is suggested to be 'stubborn', and hence able to enter domains not accessible to a single-feature absolutive probe. These characteristics of matrix probes, in combination with independently motivated structural considerations, will be shown to adequately capture the data under scrutiny.

The paper is organised as follows: section 2 illustrates the long-distance agreement patterns, and extracts a generalisation from the presented data. Section 3 is dedicated to the analysis, where section 3.1 sets the stage with a discussion of the properties of different types of Agree probes and the theoretical implementation thereof, section 3.2 provides an account of long-distance agreement across absolutive clauses, and section 3.3 deals with dative clauses. Section 4 extends the analysis to another type of nominalised clause and presents an interesting twist as well as a possible way of incorporating it into the current proposal. Section 5 concludes.

2. *Long-distance agreement: the generalisation*

The properties of Basque nominalised clauses have been a topic of much recent work (see, i.a., San Martin & Uriagereka 2002; Etxepare 2006; Preminger 2009; Duguine 2012; San Martin 2012; Řezáč et al. 2014). The main empirical focus of this paper lies in the type of nominalised clause whose nominal part consists of the nominalising suffix *-tze* and the definite determiner *-a*. These clauses, which I will refer to as *-tzea* clauses, behave like arguments of the matrix verb: they appear in argument positions, are marked with absolutive, ergative, or dative case, and trigger third person singular agreement in the corresponding case (San Martin & Uriagereka 2002; Artiagoitia 2003; Duguine 2012). This is illustrated in (2) for a dative-marked *-tzea* clause.[1]

(2)   [Haurrek   irakur-tze-a-**ri**]   lehentasuna eman
          children.ERG read-NMS-DET-**DAT** priority   give
          d-i-Ø-**o**-gu.
          3.ABS-AUX-SG.ABS-**3SG.DAT**-1PL.ERG
          'We gave the priority to the children's reading.'   (Duguine 2012:(8a))

The point of interest for the present discussion is that, for some Basque speakers, these clauses allow long-distance agreement (hereinafter LDA) between an object they embed and the matrix auxiliary.[2] Such long-distance dependencies are, however, not available in an unrestricted manner: they are only possible across complement clauses (i.e., absolutive and dative, but not ergative clauses), and, as will be shown, the degree to which they can be established varies de-

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[1] In Basque finite clauses, the phi-features (person and number) of the absolutive, ergative, and dative arguments are typically reflected on the auxiliary, which also inflects for tense and mood; the main verb surfaces as a participle, providing aspectual information. Synthetic (i.e., inflecting) main verbs exist, but are very rare (Hualde et al. 2003; Laka 1993:28f.).

[2] Etxepare (2006:303, fn. 2) characterises LDA as a 'substandard phenomenon', not obtainable by many speakers and disapproved of in formal contexts, but one that can nevertheless be found in literary works.

pending on the case of the nominalised clause and the case and featural makeup of the embedded object.

To begin with, both absolutive and dative clauses allow LDA with an embedded third person absolutive object. This is illustrated in (3) for an absolutive clause and in (4) (repeated from (1)) for a dative clause. In both examples, the only possible source of the plural agreement on the matrix auxiliary is the embedded object. Interestingly, note that the choice of the agreement morpheme reflecting the plural features of the embedded object depends not on the case of the object, but on the case of the clause: if the clause is absolutive (3), the plural features are reflected by an absolutive plural affix; if, on the other hand, the clause is dative (4), then the plural features of the embedded object contribute to the form of the dative agreement morpheme, even though the object itself bears absolutive case. In particular, the latter example shows that, in LDA contexts, a single agreement morpheme on the matrix auxiliary (in this case, *-e*) may reflect two syntactic elements, the nominalised clause and the embedded object, at the same time. This points to the conclusion that LDA with the embedded object has to be in some way mediated by the clause itself — if LDA was an entirely direct relation between the matrix auxiliary and the embedded object, then we would expect the absolutive object in (4) to result in absolutive (not dative) plural agreement on the matrix auxiliary, contrary to fact.[3],[4]

(3) [Liburuak irakur-tze-a-**Ø**] gustatzen Ø-zai-zki-t.
      book.PL.ABS read-NMS-DET-**ABS** like   **3.ABS**-AUX-PL.ABS-1SG.DAT
      'I like to read books.'   (Etxepare 2006:(98))

(4) Uko   egin d-i-e-Ø   [kalteordainak   eska-tze-a-**ri**].
      refusal do 3.ABS-AUX-3PL.**DAT**-3SG.ERG damage.PL.ABS ask.for-NMS-DET-**DAT**
      'He/she refused to pay damages.'   (Etxepare 2006:(2b))

Importantly, LDA with an absolutive argument is only possible if the latter is an object; LDA with a subject, whether absolutive or ergative, is ruled out (5). Moreover, embedded subjects, either overt or pro, are not only themselves unable to agree with the matrix auxiliary, they also block LDA with embedded objects (6).

(5) [Haurrak   geldi ego-te-a]   gustatzen
       child.DET.PL.ABS quiet be-NMS-DET.ABS like
       Ø-zai-(*zki-)t.
       3.ABS-AUX-(*PL.ABS-)1SG.DAT
       'I like that the children be quiet.'   (Etxepare 2006:(98))

(6) Jonek$_i$ [pro$_j$ / Mikelek   nobela erromantikoak   irakur-tze-a]
      Jon.ERG   pro / Mikel.ERG novel romantic.DET.PL.ABS read-NMS-DET.ABS
      proposatu d-(*it-)u-Ø.
      proposed 3.ABS-(*PL.ABS-)AUX-3SG.ERG
      'Jon proposed for Mikel to read romantic novels.'   (after Etxepare 2006:(20))

I will not attempt to provide an explanation for examples such as (5) and (6), but only note that

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[3] As will be discussed in detail below, the exact implementation of the mediating role of the nominalised clause presents one of the crucial points of divergence between the analysis to be defended here and the ones that have hitherto been proposed (specifically by Etxepare 2006 and Preminger 2009).

[4] The reader might have noticed that the nominalised clause sometimes appears in the initial, and sometimes in the final position. According to Etxepare (2006:311, fn. 8), this has no influence on the availability of LDA.

the incompatibility of LDA with embedded subjects could be related to its incompatibility with embedded temporal adverbs anchored to utterance time (such as 'tomorrow'; see section 3.2.3). Both these properties may entail additional structure, which could then block a long-distance dependency (see Etxepare 2006 and Preminger 2009 for discussion).

Moving on to (third person) dative objects, they can only enter LDA if embedded into a dative clause (7). Etxepare (2006:340) notes that the result is 'not as natural' as with embedded absolutive objects, but that there is still a sharp contrast in comparison to LDA with dative objects embedded into an absolutive clause, which is entirely unacceptable (8).

(7) ?Uko   egin d-i-Ø-e̱-Ø   [buruzagiei
     refusal done 3.ABS-AUX-SG.ABS-3PL.DAT-3SG.ERG   chiefs.PL.DAT
     obedi-tze-a-ri].
     obey-NMS-DET-DAT
     'He/she refused to obey the chiefs.'   (Etxepare 2006:(105))

(8) *Erabaki d-it-u-Ø   [buruzagiei   obedi-tze-a].
     decided 3.ABS-PL.ABS-AUX-3SG.ERG   chiefs.PL.DAT obey-NMS-DET.ABS
     'He/she decided to obey the chiefs.'   (Etxepare 2006:(106))

As was the case with absolutive arguments, which could only enter LDA if they were objects, the structural position of the embedded dative argument is important as well. Even in dative clauses, LDA is only allowed if the embedded dative argument is a direct object, and is ruled out if it is an indirect object: compare the ungrammatical (9) with the only slightly unnatural (7). The reason for this restriction will be explored in more detail in section 3.3.3, making crucial use of the different structural positions of direct and indirect objects.

(9) *Uko   egin d-i-Ø-e̱-Ø   [lankideei   opari
     refusal done 3.ABS-AUX-SG.ABS-3PL.DAT-3SG.ERG   colleagues.PL.DAT present
     bat egi-te-a-ri].
     one do-NMS-DET-DAT
     'He/she refused to give a present to the colleagues.'   (Etxepare 2006:(108))

Finally, the person features of the embedded object play an important role in constraining LDA as well. Agreement with participant (first or second person) objects is impossible across absolutive clauses, regardless of whether the object is cross-referenced by both the person and the number agreement affix or only the number affix (10). In dative clauses, however, the person features of the object have no impact on the acceptability of LDA (11).[5]

(10) *[Zu   gonbida-tze-a-Ø]   baztertu {za̱-it-u-zte   /
      you.ABS invite-NMS-DET-ABS refused {2.ABS-PL.ABS-AUX-3PL.ERG /
      d-it-u-zte}.
      3.ABS-PL.ABS-AUX-3PL.ERG}
      'They have refused to invite you.'   (Etxepare 2006: (117b))

(11) ?Arteak   uko   egin d-i-zue-Ø   [ZUEI
      Artea.ERG refusal do   3.ABS-AUX-2PL.DAT-3SG.ERG you.PL.DAT

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[5] Capitalisation indicates that the pronoun is unpronounced.

obeditzea-**ri**].
obey.NMS.DET-**DAT**
'Artea refused to obey you.' (R. Etxepare, p.c.)

To summarise, only embedded direct objects are capable of triggering LDA; neither subjects nor indirect objects may enter a long-distance dependency with the matrix auxiliary. Among direct objects, third person absolutive ones can always enter LDA, regardless of the case of the clause they are embedded into, and dative and participant direct objects may only enter LDA if embedded into a dative clause.[6] The observed patterns are summarised in Table 1.

case of the clause	case of the object	person of the object
ABS	✓ ABS (3), *DAT (8)	✓3, *1/2 (10)
DAT	✓ ABS (4), ?DAT (7)	any (11)

Table 1

An analysis of these patterns thus cannot rely (solely) on absolute restrictions, but has to take into account both the case of the clause and the case and featural specifications of the embedded object. In order to pinpoint the exact nature of these interactions, I will consider two guiding questions: firstly, why is LDA with dative and participant arguments impossible across an absolutive clause, but possible across a dative clause? In other words, why is a dative clause seemingly more transparent for LDA than an absolutive clause? Secondly, what yields the LDA hierarchy $\text{ABS} > ?\text{DAT}_{\text{direct}} > *\text{DAT}_{\text{indirect}}$ across dative clauses? The task of the following section is to answer these questions.

3.   The analysis

The answer to the first guiding question, namely, why dative clauses appear to be more transparent for LDA dependencies than absolutive clauses, forms the core of the analysis developed here. Briefly, the different degrees of LDA transparency of absolutive and dative clauses will be derived from the different properties of the probes underlying absolutive and dative agreement. I will therefore begin the discussion by outlining the basic properties of these probes in section 3.1, and then develop the proposal to provide an answer to the first guiding question, focusing first on (apparently) less transparent absolutive clauses in section 3.2, and then turning to (apparently) more transparent dative clauses in section 3.3. Finally, in section 3.3.3, I will address the second guiding question, concerning the LDA hierarchy $\text{ABS} > ?\text{DAT}_{\text{direct}} > *\text{DAT}_{\text{indirect}}$ across dative clauses, and show that this hierarchy arises from the interaction of the dative probe with the syntactic structures entailed by these three different types of object.

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[6] The role of number is difficult to determine as LDA with a singular argument is in the majority of cases indistinguishable from a non-LDA pattern where the auxiliary only cross-references the whole clause. A context where the role of number for LDA could be investigated would be LDA with an embedded participant across a dative clause. While LDA is possible if the embedded object is plural (11), I unfortunately have no data to show if LDA is possible with an embedded singular participant object.

3.1. The probes

The present analysis is couched in the Obligatory-Operations Model of Preminger (2014). In this model, a probe instantiating a syntactic operation (e.g., Agree) is obligatorily launched as soon as an element that contains it (e.g., the Infl head) is merged into the structure. An operation is thus obligatory in and of itself, rather than indirectly (e.g., as a result of the need for uninterpretable features to be checked and deleted lest they cause a 'crash' at the interfaces; see Chomsky 2000, 2001). This has as a consequence that operations may fail: what is essential for the outcome of a derivation to be grammatical is not that the operation succeed, but only that it be triggered; once initiated, it can fail, leading not to ungrammaticality, but to the surfacing of default features (Preminger 2009, 2014:115).[7] A context leading to failure of an operation arises if, for instance, the probe instantiating the operation finds no suitable goal, or if it encounters a phase, as we shall see will be the case in the Basque examples discussed here. There are two further properties that probes can have in the Obligatory-Operations Model, apart from being fallible, both of which are crucial for the proposal at hand: case-sensitivity and exact phi-featural specifications. I will first discuss the theoretical implementation of these two properties and then address the specifications of the Basque probes.

Beginning with case-sensitivity, Preminger (2014) shows that probes underlying Agree have to be capable of discriminating between goals with respect to the latter's case. This means that case assignment cannot be a reflex of agreement (as in Chomsky 2000, 2001), but rather has to be calculated before the operation Agree is initiated. This is done via a dependent case mechanism (Bobaljik 2008), which Preminger (2014) argues takes place in the syntax, rather than post-syntactically, thus allowing the probes responsible for the (syntactic) operation Agree to be sensitive to the case of their putative goals.

As for featural specifications, Béjar (2003) proposed that probes can be specified to look for particular phi-features. Following Béjar (2003), Béjar & Řezáč (2009), and Preminger (2014), among many others, the phi-featural specifications of probes can be modelled as subsets of a hierarchical feature geometry (Harley & Ritter 2002). In a feature-geometrical framework, features are not binary, but are privative elements. They are organised into hierarchical structures, where feature geometries including marked features (e.g., plural or participant) entail (i.e., are supersets of) feature geometries that include unmarked features (e.g., singular or third person). The feature geometries corresponding to the featural specifications relevant for the present proposal are illustrated in (12). The root node of the feature geometry (labelled φ in the diagrams) is the default, and corresponds to third person features. The number node (#), which is the daughter of φ, corresponds to singular features. Both aspects can be further specified: a participant node can be added (since the distinction between first and second person is irrelevant here, I ignore this difference) and so can a plural node. The diagrams should make clear what is meant by entailment in a feature-geometrical framework: the feature geometry corresponding to third person plural, for instance, entails the feature geometry corresponding to third person singular because the latter is a proper subset of (i.e., necessarily included in) the former.

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[7] In a Chomskian Agree framework, failure is not an option because it would inevitably lead to unchecked and undeleted uninterpretable features and, as a consequence, a crash at the interfaces.

(12) [3SG]: ϕ   [3PL]: ϕ   [1/2SG]:   ϕ   [1/2PL]:   ϕ
           | | ⌃   ⌃
           #   #   part   #   part   #
                          | |
                          pl   pl

In essence, then, a feature hierarchy has two parts: a person and a number part. Applying these insights to the operation Agree as conceived in the Obligatory-Operations Model, in order for a goal to be able to value a probe, its feature geometry has to either match or be richer than the feature geometry on the probe. Put differently, the goal needs to be specified for either the features that the probe is looking for or for features that entail the features that the probe is looking for. Goals that only include a subset of the probe's feature geometry will lead to failure and, consequently, to default agreement. To illustrate, if a probe is specified to look for participant features (which entail third person features), then only goals bearing participant features will be able to value this probe; third person goals will lead to failure. This, as will be illustrated presently, will be the case for the Basque absolutive person probe. If, on the other hand, a probe is specified to look for third person features (which, third person being the default, corresponds to the probe not being specified to look for any particular features at all), then both third person and participant goals will be able to value it. Similar behaviour will be demonstrated to apply to the Basque dative probe.

   We can draw conclusions about the specifications of Basque Agree probes with respect to both case and phi-features (as a shorthand for subsets of a feature geometry) from the agreement morphemes that surface on the matrix auxiliary. As can be seen in the auxiliary schema in (13), illustrated in (14), three types of arguments can be cross-referenced on the auxiliary: absolutive, dative, and ergative. It seems rather straightforward, then, to assume that Basque has absolutive, dative, and ergative probes. Given that LDA is only possible across absolutive and dative clauses, I will focus only on absolutive and dative probes, and will not comment on the nature of ergative probes.

(13)   π.ABS – root – #.ABS – DAT – ERG   (adapted from Laka 1993:(22))

(14)   d-   i-   zki-   o-   t
        3.ABS- AUX- PL.ABS- 3SG.DAT- 1SG.ERG

Turning to the phi-featural specifications, note that the person and number features of the absolutive argument are reflected on the auxiliary by two separate agreement morphemes, while the dative argument is cross-referenced by a single morpheme containing all its phi-features (a property referred to by Preminger 2014:50-54 as 'featural coarseness'). This suggests that absolutive agreement on the one hand, and dative agreement on the other, may result from slightly different mechanisms. In fact, Béjar & Řezáč (2009) and Preminger (2009, 2011) propose that absolutive agreement in Basque arises through separate probes for person and number, and that these probes are specified to look for participant (15-a) and plural features (15-b), respectively. I adopt this proposal and, pursuing the same intuition, suggest that dative agreement arises by virtue of a combined probe for person and number, which looks for no particular features (15-c).

(15)   a.   ABSπ [1/2]   b.   ABS# [PL]   c.   DAT [ϕ]

These specifications predict that the absolutive probes will succeed only if they encounter a goal that bears participant and plural features; goals with other specifications will lead to failure. The

dative probes, on the other hand, will be able to receive a value from arguments bearing any phi-features. These differences between the absolute and dative probes will play a crucial role in explaining the LDA patterns under scrutiny.

3.2.   Absolutive clauses
3.2.1.   Restricted number

As just outlined, I assume, with Béjar & Řezáč (2009) and Preminger (2009, 2011), that Basque has two separate absolutive probes for person and number, which are specified to look for participant and plural features, respectively. Therefore, only goals bearing participant features are able to value the person probe, and only those bearing plural features are able to value the number probe. Since third person and singular features are lower on the feature-geometrical hierarchy than participant and plural features, respectively, a person probe encountering a third person argument will fail, as will a number probe encountering a singular argument. Importantly, under the Obligatory-Operations Model adopted here, this will not result in an ungrammatical derivation, but in default agreement. Note that the same goal may yield a different outcome for the two probes: in a simple finite clause containing a first person singular absolutive argument, for instance, the person probe will succeed, and yield first person agreement, while the number probe will fail, resulting in default singular agreement. The inverse scenario, where the person probe fails and the number probe succeeds, is, naturally, possible as well.

I follow Preminger (2009, 2011) in assuming that these two probes are ordered: the person probe probes first, followed by the number probe. The person probe is additionally proposed, in a sense, to clear the way for the number probe, which is in turn then able to reach elements that are more deeply embedded (see section 3.2.2 below for the exact theoretical implementation of this proposal). This accounts for what Preminger (2011:922) terms the 'hierarchy of fragility' in agreement, found in a range of typologically diverse languages: person agreement at a distance is more likely to fail than number agreement at a distance. Recall that this is precisely the pattern we find in the Basque LDA examples: in consonance with the hierarchy of fragility, and as expected from the proposed ordering of the probes, the matrix number probe is able to agree with an object embedded into an absolutive clause ((16), repeated from (3)), but the matrix person probe is not ((17), repeated from (10)).

(16)   [Liburuak   irakur-tze-a-Ø]   gustatzen Ø-zai-zki-t.
         book.PL.ABS read-NMS-DET-ABS like   **3.ABS**-AUX-PL.ABS-1SG.DAT
         'I like to read books.'   (Etxepare 2006:(98))

(17)   *[Zu   gonbida-tze-a-Ø]   baztertu {za-it-u-zte   /
         you.ABS invite-NMS-DET-ABS refused {2.ABS-PL.ABS-AUX-3PL.ERG /
         d-it-u-zte}.
         3.ABS-PL.ABS-AUX-3PL.ERG}
         'They have refused to invite you.'   (Etxepare 2006: (117b))

Still, as established in section 2, the ungrammaticality of *dituzte* in (17) shows that number LDA, too, is impossible if the embedded object is a participant. This cannot be derived solely from successive probing, but calls for an additional constraint, whose nature can be inferred from the Basque agreement morphemes for first and second person. The forms of these mor-

phemes depend not only on the person, but also on the number of the argument they reflect (e.g., in the present tense, 1SG yields *na-*, and 1PL yields *ga-* plus a plural morpheme), implying an interaction between the person and the number probe. I suggest that this interaction is not arbitrary, but that the range of possible goals for the number probe is restricted by the featural makeup of the goal encountered by the person probe:

(18)   *Restricted number* (informal definition)
         If the person probe targets a participant argument (i.e., if it succeeds), then the number probe has to target a participant argument as well. Conversely, if the person probe does not target a participant argument (i.e., if it fails), then the number probe cannot target a participant argument, either.

The reason for this restriction can be found in the form of the hierarchical feature geometry. Béjar (2003) argues that valuation of a probe corresponds to copying the subset of the feature geometry (representing the featural specification) found on its goal. Applying this to the Basque absolutive person probe, which, recall, is specified to look for participant features, a successful probing cycle is illustrated in (19): the probe targets a participant DP (the featural specifications in square brackets are included only for legibility; the actual specifications are provided by the depicted feature geometries). For concreteness, I have chosen a singular DP, but a plural one would yield the same result: since the probe only probes for person, only the person part of the feature geometry of the goal is copied onto the probe, resulting in a valued probe on the right-hand side of the example. A situation where the person probe fails is illustrated in (20): in this case, the probe encounters a third person argument. Since the probe can only be valued by participant arguments, it fails, and receives no value. This results in the reduction of the probe to the root of the feature hierarchy (ɸ; see Béjar 2003) and the surfacing of default agreement.

(19)   ABSπ ... DP: [1/2SG] ⤳ ABSπ: [1/2]   (20)   ABSπ ... DP: [3SG] ⤳ ABSπ: [ ]
                        ɸ   ɸ   ɸ   ɸ
                       ⌒ | | |
                    part #   part   #
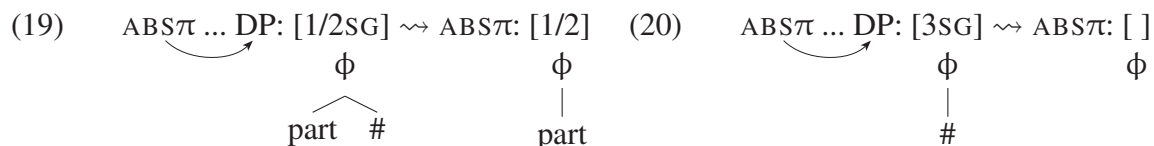
With the valuation mechanism in place, we can now turn to the restriction that the person probe imposes on the number probe. Assuming that the number probe has access to the subset of the feature geometry recorded by the person probe, and that it is only able to add to this geometry the node representing number features, but not change the part of the tree corresponding to the person side, it will have to find a matching goal. In other words, the number probe looks for the missing piece of the jigsaw to complete the absolutive feature geometry. The possible probing sequences are illustrated in (21) and (22). In both examples, the left-hand side of the example represents the person probe after having probed, and is followed by two hypothetical subsequent probing steps by the number probe: a potentially successful one in (a), and an inevitably unsuccessful one in (b). In (21), the person probe has succeeded, meaning that it has been valued by the targeted argument: a person feature geometry containing a participant node has been copied onto the probe (as in (19) above). As a consequence, the number probe may target only an argument that contains the participant node as well. Bearing in mind that the number probe is specified to look for plural features, the step in (a), where the number probe in fact targets a participant argument, will be successful if the goal contains plural features (if the goal contains singular features, the number probe will fail). The step in (b), however, is doomed to fail,

since the goal of the number probe is not a participant, and hence does not match the feature geometry previously copied onto the person probe. Therefore, even if the goal bears plural features, as illustrated in the example, the number probe will not be able to agree with it, and will inevitably yield default agreement (as outlined above, I assume that failure results in the probe being reduced to the very root of the feature geometry). Example (22) can be explained in a parallel manner: since the person probe has failed (cf. (20) above), the number probe will only be able to target third person arguments, potentially agreeing with them for plural (a). It will not be able to successfully target a participant argument (b); such a configuration will inevitably lead to failure and default agreement, even if the targeted DP contains plural features.

(21)   ABSπ: [1/2] →   a. ABS# ... DP: [1/2PL] ⇝ ABS#: [PL]   b. ABS# ... DP: [3PL] ⇝ ABS#: [ ]
          φ   φ   φ   φ   φ
          | ╱╲ | | |
        part   part   #   #   #
                                    | | |
                                    pl   pl   pl

(22)   ABSπ: [ ] →   a. ABS# ... DP: [3PL] ⇝ ABS#: [PL]   b. ABS# ... DP: [1/2PL] ⇝ABS#: [ ]
          φ   φ   φ   φ   φ
                              | | ╱╲
                              #   #   part   #
                              | | |
                              pl   pl   pl

The restriction in (18) can therefore be restated as follows:

(23)   *Restricted number* (feature-geometrical definition)
        The range of goals that the absolutive number probe can successfully agree with is
        restricted to those whose person side of the feature geometry corresponds to the subset
        of the feature geometry previously copied onto the absolutive person probe.

This restriction will be crucial for deriving the LDA patterns across absolutive clauses. In a simple finite clause with a single absolutive argument, it will have no effect since the number probe will inevitably target the same argument that the person probe has targeted, this argument being the only viable goal in the clause. Still, before turning to the analysis of Basque LDA, let us take a brief look at a phenomenon that lends independent support to the probe specifications and ordering, as well as the restriction proposed above: the Person-Case Constraint (PCC).

3.2.2.   *Person-Case Constraint*

The PCC is a pervasive phenomenon in languages across the world, stating roughly that (phonologically weak) direct objects are restricted to third person in the presence of a (phonologically weak) indirect object (see, i.a., Bonet 1991; Anagnostopoulou 2003; Béjar & Řezáč 2003). In Basque, the PCC is reflected as a constraint on the form of the finite auxiliary: there exist no forms that cross-reference both a participant absolutive object and an indirect (dative) object. This is illustrated by the contrast below: an indirect (dative) object is only compatible with a third person direct (absolutive) object (the form of the auxiliary in (25) is only hypothetical, and does not in fact exist).

(24) Zuk   niri   liburuak   saldu d-i-zki-da-zu.
      you.ERG I.DAT   books.DET.ABS sold 3.ABS-AUX-PL.ABS-1SG.DAT-2PL.ERG
      'You have sold the books to me.'   (M. Urquiza, p.c.; after Laka 1993:(7a))

(25) *Zuk   harakinari   ni   saldu na-i-o-zu.
      you.ERG butcher.DAT I.ABS sold 1.ABS-AUX-3SG.DAT-2PL.ERG
      'You have sold me to the butcher.'   (Laka 1993:(7b))

Note further that, while agreement for number (with third person absolutive objects) is possible in such configurations (24), agreement for person is not (25). The PCC in Basque, then, appears to adhere to the very same pattern as LDA across an absolutive clause, and, as already observed by Preminger (2011), can thus also be subsumed under the crosslinguistically valid hierarchy of fragility (number agreement at a distance is less prone to failure than person agreement at a distance). As outlined above, Preminger derives this hierarchy by imposing an ordering on the two probes — person before number — and by making it possible for the person probe to render an intervening element invisible to the number probe. One strategy that he employs to accomplish this is a phase-unlocking logic similar to the one proposed in Rackowski & Richards (2005), where a phase boundary targeted by a probe can be ignored by this probe for the rest of the derivation. Due to the tight connection between the person and number probes, Preminger proposes that the person probe can unlock a phase for subsequent probing by the number probe.

This proposal, combined with the probe specifications and the restriction on the number probe in (18), can successfully derive the data in (24)/(25).[8] Assuming that an indirect object is introduced into the structure as the specifier of a high applicative head (Pylkkänen 2000), and that this head projects a phase (McGinnis 2001), a derivation of a sentence with a dative indirect object would proceed as shown in (26). After the applicative phrase has been completed, a head containing the absolutive person and number probes is merged. The label Aux is used only for expository purposes; I am not committed to any particular nature and location of this head, and also leave open the possibility that the person and number probes are triggered by separate heads (as in, e.g., Preminger 2011).[9] The probing starts by the person probe, which encounters the phase constituted by v_{appl}P, and, since v_{appl}P is, evidently, not a participant, the person probe fails (indicated by the dashed arrow in the tree diagram). As discussed above, this yields default (third person) agreement. However, by targeting the phasal v_{appl}P, the person probe has unlocked it, enabling the number probe to cross it and find the absolutive object. Crucially, given the restriction in (18), the number probe is then only able to target third person arguments, which explains the impossibility of a participant absolutive object in constructions including an indirect object: the person probe will inevitably target the phasal v_{appl}P and thereby restrict the range of possible goals for the number probe to third person arguments.[10]

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[8] Preminger himself also analyses the PCC in Basque, albeit in a manner which differs slightly from the analysis pursued here. The interested reader is referred to Preminger (2011), in particular p. 924.

[9] Béjar & Řezáč (2009) situate the person probe on little *v*, while Arregi & Nevins (2008) argue that these probes have to be merged into a higher position.

[10] Since probes are case-discriminating, I assume that the dative argument is ignored by the absolutive probes.

(26)

```
                            AuxP
                   ╱                 ╲
            v_appl P                    Aux
          ╱        ╲                 ABSπ  ABS#
      DP.DAT
                   VP      v_appl
                 ╱    ╲
            DP.ABS     V
              ╱╲
          ✓[3], *[1/2]
```
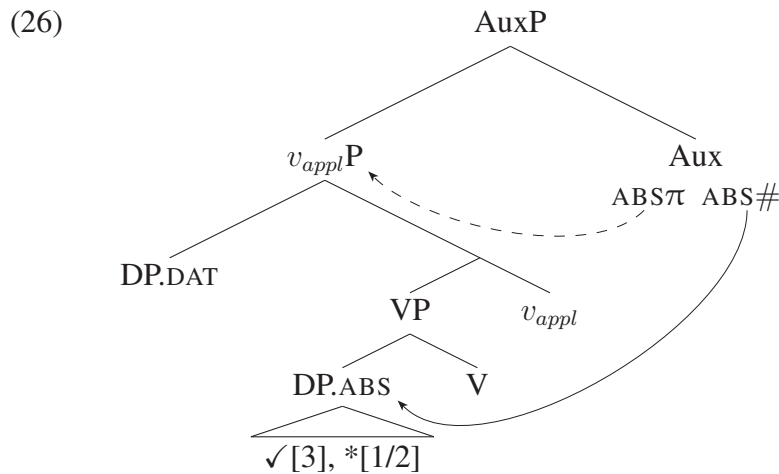
The hierarchy of fragility in general and the Basque PCC data in particular thus provide evidence for the person probe taking precedence over the number probe, since the inverse ordering would, all other things being equal, make the wrong predictions. If the number probe were to probe first, then we would expect it to encounter the phasal v_{appl}P and fail, predicting plural agreement (as in (24)) to be impossible in such configurations. Moreover, applying the phase-unlocking logic would enable the person probe to successfully target the absolutive argument, regardless of the latter's person features, predicting examples like (25), once again incorrectly, to be grammatical.

3.2.3.   *LDA across absolutive clauses*

Having shown that the ordering of the probes and the restriction on the number probe in (18) are needed independently of LDA, let us finally turn to absolutive *-tzea* clauses and tackle the mechanism behind LDA. The underlying structure of *-tzea* clauses may, rather uncontroversially, be divided into a verbal and a nominal domain. As outlined in section 2, their nominal domain consists of the nominaliser *-tze* and the (clausal) definite determiner *-a*, which, following Preminger (2009), may be analysed as realising an *n* and a D_c head, respectively (the subscript $_c$ stands for 'clausal', leaving open the possibility that the definite determiner heading *-tzea* clauses is not the same element as a regular nominal determiner). As for their verbal domain, *-tzea* clauses normally allow overt subjects and may be modified by temporal adverbs anchored to utterance time (such as 'in two days from now' or 'tomorrow'). Interestingly, these attributes change if LDA between the embedded object and the matrix auxiliary is established (Etxepare 2006; San Martin 2012). Example (27) (repeated from (6)) shows that LDA — evident from the plural agreement affix *-it* corresponding to the plural embedded object — is impossible if the nominalised clause includes a subject, either overt or pro. Example (28) shows the same for configurations in which the nominalised clause is modified by an adverb such as *bihar* 'tomorrow'.[11] This change in the temporal properties and the unavailability of a subject in the context of LDA points to a significantly reduced verbal part of the nominalised clause, specifically a VP (or *v*P), following Preminger (2009).

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[11] The different ordering of agreement morphemes on the auxiliary in (28) is due to a phenomenon called ergative displacement (see, i.a., Laka 1993; Béjar & Řezáč 2009; Keine 2010: chapter 4, as well as section 4.2 below).

(27) Jonek$_i$ [pro$_j$ / Mikelek   nobela erromantikoak   irakur-tze-a]
      Jon.ERG   pro / Mikel.ERG   novel romantic.DET.PL.ABS read-NMS-DET.ABS
      proposatu d-(*it-)u-Ø.
      proposed 3.ABS-(*PL.ABS)-AUX-3SG.ERG
      'Jon proposed for Mikel to read romantic novels.'   (after Etxepare 2006:(20))

(28) [Bihar   liburu batzuk sal-tze-a]   pentsatu
       tomorrow book[s] some sell-NMS-DET.ABS plan
      gen-(*it-)u-en.
      1PL.ERG-(*PL.ABS-)AUX-PST
      'We planned to sell some books tomorrow.'   (Etxepare 2006:(27b))

With all the necessary components in place, we are now in a position to consider the derivation of LDA itself. The underlying structure of an example such as (29) (repeated from (3)) is depicted in (30). After the clausal DP$_c$ has been constructed, it is merged first with the matrix verb, and then with a head containing the absolutive probes (once again, the label Aux is used only as a placeholder for the head or heads hosting these probes). As outlined above, the person probe probes first and encounters DP$_c$, which, being a clause, does not bear participant features. The person probe therefore fails (indicated by a dashed arrow), yielding default third person agreement. Similarly to what we have seen in the PCC example in (26) above, by targeting DP$_c$, which constitutes a phase (see McGinnis 2001; also Preminger 2009), the person probe renders it permeable for subsequent probing by the number probe. The number probe can then find the embedded absolutive object, but, due to the restriction in (18), it will only be able to target a third person argument: the failure by the person probe will result in its reduction to the root of the feature geometry ([φ]), so the number probe will only be able to target arguments with a matching person-portion of the feature geometry, i.e., third person arguments (as illustrated by the schema in (22) above).

(29) [Liburuak   irakur-tze-a-**Ø**]   gustatzen **Ø**-zai-zki-t.
      books.PL.ABS read-NMS-DET-**ABS** like   **3.ABS**-AUX-PL.ABS-1SG.DAT
      'I like to read books.'   (Etxepare 2006:(98))

(30)

```
                            AuxP
                          /      \
                       VP         Aux
                      /  \        ABSπ  ABS#
                 DP_c.ABS   V
                /      \     ⟵ ┄
             nP      D_c.ABS
            /  \
          VP    n
         /  \   NMS
     DP.ABS  V
        ↖
   ✓[3], *[1/2]
```
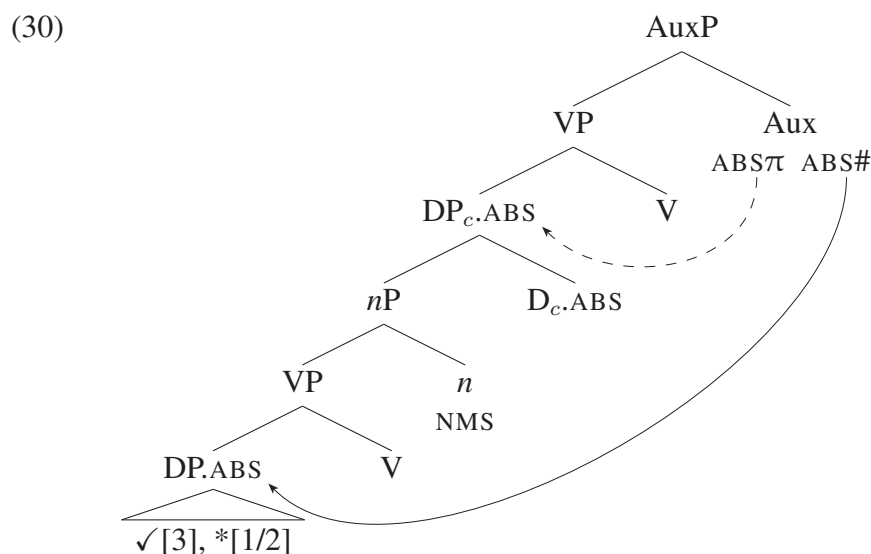
There is one important difference between the LDA and the PCC examples: while the failure

of the absolutive probe(s) in LDA results in default agreement, it leads to an ungrammatical outcome in a PCC context. This can be explained by the Person Licensing Condition axiom (Béjar & Řezáč 2003:53) which, in its modified version (Preminger 2011), states that an argument bearing participant features has to agree with a person probe if the two are part of the same clause. Since the participant argument and the absolutive probe are indeed part of the same clause in PCC contexts, but not in LDA contexts, failure to agree will lead to an ungrammatical result in the former case, but to default agreement in the latter. Crucially, the ungrammaticality of the PCC examples is not a direct consequence of the failure of the probes, but arises by virtue of an independent constraint — the Person Licensing Condition.

The availability of LDA across absolutive clauses thus arises from an interplay between the featural specifications of the absolutive person and number probes (15), the restriction in (18), and the possibility of phase-unlocking. Returning to the guiding questions posed at the end of section 2, the unavailability of LDA with participant objects across absolutive clauses is accounted for by the restriction in (18): the person probe will always target the DP_c, restricting the range of possible goals for the number probe to third person arguments. As for the unavailability of LDA with dative arguments, this can be explained simply through the case-discriminating property of probes: an absolutive probe cannot target a dative argument, and hence absolutive agreement morphemes will not be able to reflect the phi-features of a dative argument. Furthermore, if, as suggested by Etxepare (2006), the number and nature of probes in a finite clause reflect the number and nature of the arguments taken by the main verb, then no dative probe will be available in the examples under scrutiny, and no dative agreement will be able to take place.

3.2.4.   *Previous proposals*

Before closing this section and turning to dative clauses, a juxtaposition of the current proposal with those previously put forward, notably by Etxepare (2006) and Preminger (2009), is in order. A comparison with the latter can be drawn rather straightforwardly, since several of its components (viz., the structure of *-tzea* clauses, the fallibility of agreement, and the phi-featural specifications of the Basque absolutive probes) have been adopted here. Both Preminger's and the present analysis exclude LDA with dative objects by limiting the goals of the probes involved to absolutive arguments, and explain the impossibility of person LDA by proposing that the matrix person probe targets the DP_c and fails, inducing default agreement. The two diverge, however, in their ability to capture the remaining empirical point — the impossibility of number LDA with participant objects, illustrated in (31) (partially repeated from (10)).

(31)   *[Zu   gonbida-tze-a-Ø]   baztertu **d**-it-u-zte.
         you.ABS   invite-NMS-DET-ABS   refused **3.ABS**-PL.ABS-AUX-3PL.ERG
         'They have refused to invite you.'   (Etxepare 2006: (117b))

The decisive difference between the two proposals concerns the way in which the number features of the embedded object end up on the matrix auxiliary: while Preminger proposes that D_c itself has a (case-discriminating) number probe, agrees with the embedded object, and then transfers its number features to the matrix auxiliary, I have argued that the embedded object agrees with the matrix number probe directly.[12] For Preminger, then, (number) LDA is appar-

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[12] Preminger does not use phase-unlocking here, ergo the matrix number probe targets the DP_c as well.

ent; it takes place indirectly and is actively mediated by D_c, whereas under the present analysis LDA is real, happens directly, and the role of D_c is a passive one: it merely causes the matrix person probe to fail and prevents it from targeting the embedded object. This is nevertheless vital since, as a consequence, due to the restriction in (18), the matrix number probe may only agree with third person objects, and the ungrammaticality of (31) follows. Preminger leaves such examples unaddressed, and, since it remains unclear why the number probe on D_c should be unable to target participant objects, they raise an issue for his proposal. A possible solution would be to extend his proposal with a more general version of the restriction in (18), limiting the range of viable goals for a number probe to third person ones not only if an associated person probe fails, but also if there is no such person probe to begin with. If, as Preminger argues, D_c only has a number probe, then this modification would achieve the desired result.

Etxepare's analysis is couched in a framework different from the one adopted by Preminger and embraced here. Etxepare proposes that agreement operates on a phase-by-phase basis and takes place by means of multiple feature valuation upon completion of a phase. He further assumes that there is a feature value identity constraint at PF requiring the values of all corresponding features shared by the elements which participate in agreement to be identical at spell-out. Concretely, in the Basque examples under scrutiny, the three key elements participating in agreement are the embedded object, the complex head of the clause consisting of T and D_c, and a matrix head (labelled Asp by Etxepare) assigning case to the clause, which is also the relevant phasal head.[13] The features involved in multiple valuation are person, number, and case, and their distribution is schematised in (32), with the valued features boxed (the unvalued case and number features on the complex T+D_c head are contributed by T, and the third person feature by D_c).

(32)   DP:[$\boxed{\pi:1/2/3}$, $\boxed{\#:\text{SG/PL}}$, $\boxed{\text{ABS/DAT}}$]   T+D_c:[$\boxed{\pi:3}$, #, CASE]   Asp:[π, #, $\boxed{\text{ABS}}$]

The only element with variable feature values, and hence the only one whose featural makeup influences the end result, is the embedded object. Given that it also contains the sole valued number feature, this value is copied onto the other two heads and poses no problem for the PF constraint. However, only a configuration containing an absolutive object is allowed to converge, since dative case would be in conflict with the absolutive case on the Asp head. Finally, a first or second person feature borne by an embedded object is ruled out by the PF constraint as well, due to its clash with the third person feature on T+D_c. Under Etxepare's analysis, then, the contrast between (licit) LDA with third person absolutive objects and (illicit) LDA with dative or participant ones does not arise due to the (un-)availability of an agreement relation itself, but is, essentially, a PF phenomenon, whereas in the analysis proposed here it is a fundamentally syntactic one. Note further that excluding dative and participant objects via a feature value mismatch with the absolutive on Asp and the third person features on the T+D_c complex predicts that an absolutive-marked *-tzea* clause should never be able to contain a dative or participant object, regardless of LDA. The fact that such configurations are not ruled out in general, but only in LDA contexts, remains in need of an explanation.

To conclude, if this last issue with Etxepare's analysis is set aside, and Preminger's proposal

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[13] Etxepare assumes that *-tzea* clauses are TPs embedding a projection headed by the clausal determiner, and that the determiner head (which Etxepare labels as Zeit, but which, for ease of exposition, I will refer to as D_c) adjoins to the T head, forming a T+D_c complex. For reasons of space, I will forego the comparison of the structure proposed by Etxepare with the one adopted here.

is extended to include a version of the constraint in (18), then both are also able to provide the first part of an answer to the first guiding question from section 2 — why LDA with participant and dative objects is impossible across an absolute clause. However, we will see presently that matters become complicated once dative clauses are taken into account.

3.3.   *Dative clauses*

In order to account for the (apparent) higher permeability of dative clauses for LDA, and thereby provide the second part of the answer to the first guiding question from section 2, I will follow the same line of reasoning that I have applied to absolutive clauses, and propose that this is in fact a consequence of the nature of the dative Agree probe. I will also address the second guiding question in this section, showing that the LDA hierarchy $\text{ABS} > ?\text{DAT}_{\text{direct}} > *\text{DAT}_{\text{indirect}}$ results from an interplay between the dative probe and the structure required by the three different kinds of arguments.

3.3.1.   *Stubborn dative*

In section 3.1, I proposed that dative agreement results from a single probe which probes simultaneously for person and number and has no particular feature specifications. This is in accordance with morphological facts: in contrast to absolutive agreement, which leads to two separate morphemes for person and number, dative agreement is reflected on the auxiliary by a single morpheme comprising both person and number features.

This observation led Arregi & Nevins (2008) and Preminger (2009) to the conclusion that the morpheme cross-referencing a dative argument in Basque is actually a clitic rather than a regular agreement morpheme. Applying the tense-invariance diagnostic formulated by Nevins (2011) yields the same result: the form of the dative morpheme remains the same across agreement paradigms for tense and mood, suggesting that we are in fact looking at clitic doubling rather than run-of-the-mill agreement (see also Arregi & Nevins 2012). Nevertheless, since Preminger (2009, 2019) argues that clitic doubling arises as a consequence of an Agree probe, I will set this distinction aside for the purposes of this paper.[14]

3.3.2.   *LDA across dative clauses*

Following Řezáč (2008), I assume that dative arguments, and hence also the dative clause, are embedded under a PP (or an equivalent projection). This is the only structural difference between a dative and an absolutive clause. Contrary to what one might expect given the higher permeability of dative clauses to LDA, then, the dative clauses comprise more, rather than less, structure when compared to their absolutive counterparts. The crucial difference between the two is the probe(s) involved: whereas an absolutive clause, as shown above, is targeted by two single-feature absolutive probes (for person and number), a dative clause is targeted by an integral dative probe, which looks for no particular phi-features.

I propose the derivation in (34) for an example such as (33) (repeated from (1)). Let us assume that the featural specification of the DP_c consists of only the root of the feature geometry

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[14] I refer the reader to Preminger (2019) for an account of clitic doubling in Basque with an underlying Agree operation (for an approach to clitic doubling without Agree, see Arregi & Nevins 2008, 2012: chapter 2).

([φ]). The difference between a regular (third person singular) DP and a nominalised clause will then only lie in the presence vs. absence of the number node, respectively. This, in turn, means that, when the dative probe encounters the DP_c, only its person part will be valued, resulting in what we might call partially successful Agree (hence a full line in (34)). In order to capture the ability of the dative probe to look beyond the DP_c in search of a more fully specified goal, I propose that this probe has a special 'stubbornness' property, which enables it to inspect the argument it has targeted if this argument is only able to partially value it. While this property is, admittedly, specifically tailored to account for the possibility of LDA, it may be connected to the fact that the dative probe is an integral probe for both person and number: as a consequence, it is more robust than a single absolutive probe, and can therefore perform the two steps taken by the person and number absolutive probes — unlocking a phase and inspecting it — in the same step. Note that this property is also needed in PCC contexts, where the dative probe needs to penetrate $v_{appl}P$ and agree with the indirect object. Returning to the derivation in (34), since the dative probe probes for both person and number, it will agree with the embedded object for both these features; in other words, the subset of the feature geometry found on the embedded object will overwrite the subset initially copied from the DP_c. Importantly, this is only possible because the dative probe simultaneously probes for both person and number; as I argued extensively in section 3.2.1 for absolutive probes, a probe looking only for number features cannot change anything about the person side of the hierarchy.

(33) Uko   egin d-i-e-Ø   [kalteordainak
      refusal do   3.ABS-AUX-3PL.DAT-3SG.ERG damage.PL.ABS
      eska-tze-a-**ri**].
      ask.for-NMS-DET-**DAT**
      'He/she refused to pay damages.'   (Etxepare 2006:(2b))

(34)
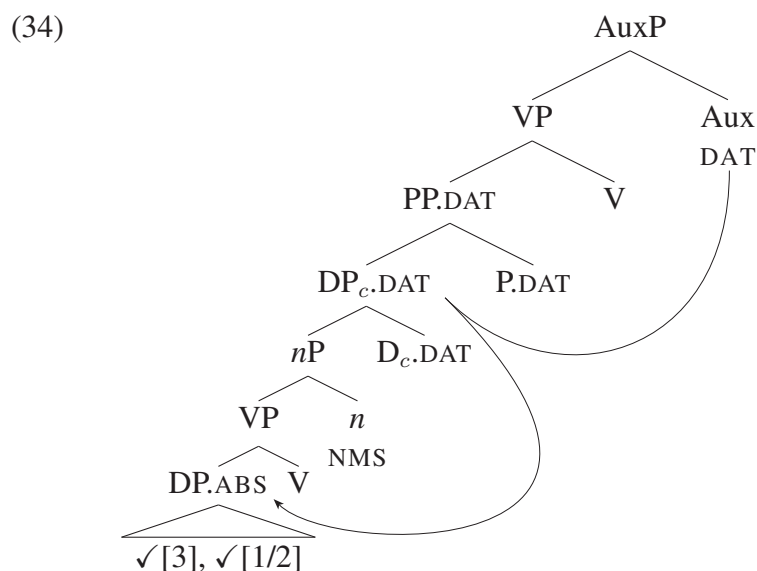
3.3.3.   The LDA hierarchy

This section is dedicated to accounting for the ABS > ?DAT_{direct} > *$DAT_{indirect}$ LDA hierarchy across dative clauses, and in this way completing the answers to the guiding questions from section 2. I propose that this hierarchy emerges as a consequence of the different degrees of

embedding of the three objects involved and the way the dative probe interacts with the resulting structures. An absolutive object, as illustrated in (34) above, is a simple DP merged as a complement to V, and is the most easily accessible of the three. I suggest that the reason why a dative probe can (exceptionally) target an absolutive argument in this context is that the latter is embedded into a dative phrase, which the probe had encountered in the course of its search, and that this is enough to satisfy the requirement that the probe target a goal bearing the case it is specified to look for.[15] Concerning the difference between dative-marked direct and indirect objects, I make use of the distinction between lexical and inherent case argued for by Woolford (2006). A dative direct object bears dative case due to the lexical properties of the selecting verb, and can hence be classified as bearing lexical case in Woolford's sense. As such, it is merged as a complement to V, just like a regular absolutive object, but includes a PP layer (Řezáč 2008), rendering it slightly less accessible to the matrix dative probe. This is reflected by the somewhat less natural outcome of LDA with a dative direct object. Finally, a dative indirect object bears inherent case in Woolford's terminology, and is introduced into the structure by an applicative phrase (Pylkkänen 2000). As already mentioned in connection to the PCC (see section 3.2.2), v_{appl}P constitutes a phase (McGinnis 2001), which makes it impossible for the matrix dative probe to access the embedded indirect object. While I have proposed that the dative probe is 'stubborn', and is hence able to penetrate a phase and target an argument that this phase contains, I suggest that it can do so only once. Therefore, as illustrated in (36) for an example such as (35) (repeated from (9)), v_{appl}P will prevent the dative probe from targeting an embedded indirect object, making LDA impossible.

(35) *Uko   egin d-i-Ø-ⓔ-Ø   [lankidee𝑖   opari
      refusal done 3.ABS-AUX-SG.ABS-3PL.DAT-3SG.ERG   colleagues.PL.DAT present
      bat egi-te-a-ri].
      one do-NMS-DET-DAT
      'He/she refused to give a present to the colleagues.'   (Etxepare 2006:(108))

(36)

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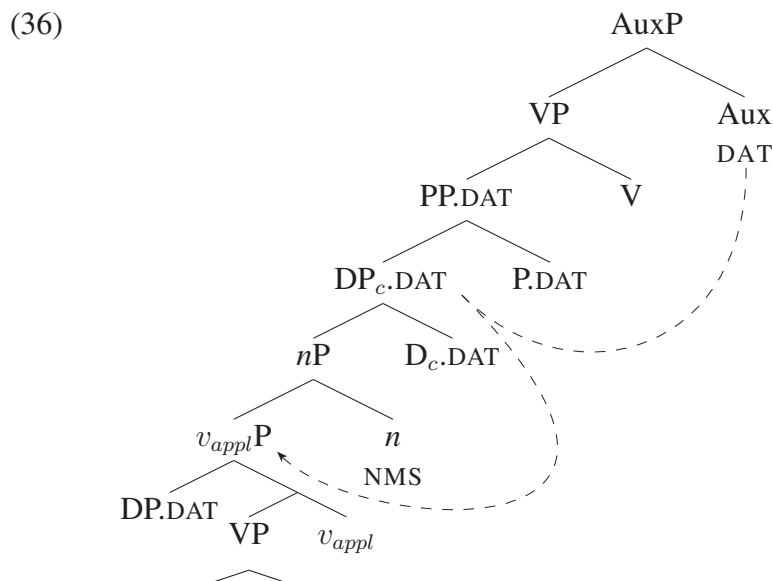
[15] Note that this changes nothing about the inability of the absolutive number probe to target an embedded dative object, since it will not interact with the absolutive clause on its way to the object.

As indicated in the previous section, LDA patterns across dative clauses present a challenge for both Etxepare's (2006) and Preminger's (2009) analysis. Recall that, in both approaches, D_c plays a vital role in accounting for the LDA patterns across absolutive clauses: Etxepare proposes that its third person feature blocks LDA with a participant argument by causing a violation of the feature value identity constraint holding at PF (LDA with a dative argument is ruled out due to its case value being at odds with the absolutive assigned to the clause), and Preminger excludes LDA with dative arguments due to D_c's number probe being restricted to absolutive arguments. It is precisely this direct mediating role ascribed to D_c which causes both said approaches to run into difficulties when faced with the difference in LDA patterns attested across absolutive and dative clauses: unless it is assumed that the properties of D_c change depending on the case of the clause, which appears to be unmotivated, the divergent behaviour of the two clauses with respect to LDA cannot be captured.

Addressing each of the analyses in turn, if Etxepare's PF feature value identity constraint rules out LDA with a participant object across absolutive clauses due to a clash between its participant features and the third person feature of D_c, and excludes LDA with a dative object due to its case value being in conflict with the absolutive assigned to the clause, then, everything else being equal, a discrepancy in person and case values should prevent LDA across dative clauses as well. Etxepare provides a solution for LDA with absolutive objects across a dative clause: somewhat simplified, he posits that the clause only gets assigned dative after the phase containing it has been spelled out. The case of the clause therefore does not participate in the evaluation of feature values at PF, and an absolutive object, being the only element with a case value, causes no problem for the feature value identity constraint. LDA with an indirect dative object is nevertheless correctly ruled out: since an indirect object in Basque invariably entails the presence of an absolutive direct object, the conflicting case values of these two objects already violate the PF constraint, and the fact that the clause acquires its case later plays no role. However, Etxepare is not able to account for the ABS > ?DAT$_{\text{direct}}$ > *DAT$_{\text{indirect}}$ hierarchy: since a dative direct object, just like a single absolutive object, is the only case-bearing element at spell-out, LDA is predicted to be just as natural as with an absolutive object. But even if this shortcoming is disregarded as a minor one, Etxepare's analysis fails to explain the availability of LDA with participant objects across a dative clause: if the clash between participant features borne by an object and the third person feature on D_c induces a violation of the PF feature value identity constraint in absolutive clauses, the same is predicted to happen in dative clauses.

Preminger's analysis faces a similar challenge: if the number probe on D_c is unable to target dative objects in an absolutive clause, then the same restriction should be at work in a dative clause, wrongly predicting that LDA with dative objects, whether direct or indirect, should be impossible across the board. Similarly, the number probe should either be able to target participant arguments (as in Preminger's original proposal) or be unable to do so (if a version of the restriction in (18) along the lines sketched above is included), predicting LDA with participant arguments to be either possible or impossible for both absolutive and dative clauses, and leaving the observed contrast unexplained.

3.4.   *Summary of the main proposal*

This section has presented an account of the LDA patterns observed in section 2. I have argued that the different patterns result mainly from the different properties of the absolutive and dative

probes: while absolutive agreement arises through two separate probes for person (looking for participant features) and number (looking for plural features), dative agreement arises through a single probe for both person and number features, without particular feature specifications. I have proposed that the absolutive number probe is restricted by the person probe in the choice of its goal, and have shown that this restriction is needed independently of LDA to derive the Person-Case Constraint. This restriction on the number probe, in combination with a phase-unlocking logic, yields the LDA patterns attested across absolutive clauses: the person probe probes first, encounters the DP_c, and fails. By doing so, it unlocks the phasal DP_c for the number probe, and restricts the range of the latter's possible goals to third person arguments. The number probe can then agree with an embedded object, but only if the latter is third person. Turning to dative clauses, I have proposed to tie their apparently higher degree of permeability for LDA to a 'stubbornness' property of the dative probe: since the dative probe looks for person and number features at the same time, it can undertake the two steps of unlocking and inspecting a phase in one go and agree with the embedded object for both person and number. This answers, in part, the first guiding question posed at the end of section 2: why LDA across dative clauses is, and LDA across absolutive clauses is not, able to target participant arguments. As for the inability of LDA with dative objects across absolutive clauses, I have suggested that this is a consequence of the absence of a matrix dative probe in these contexts. Turning to the second question, which concerns the ABS > ?DAT_{direct} > *$DAT_{indirect}$ LDA hierarchy across dative clauses, I have proposed that the underlying reason for this hierarchy is tied to the structure required by these three different arguments: an absolutive object is a bare DP merged as a complement of the embedded verb, and, as such, is most accessible to the matrix dative probe; a dative direct object, bearing lexical case, is additionally embedded under a PP, making it slightly more difficult to reach, and resulting in a less natural outcome; finally, a dative indirect object is embedded under a phasal applicative phase, which renders it entirely inaccessible to the matrix dative probe.

4.   Extensions

Before closing the paper, I would like to extend the analysis developed here along two lines. First, I will discuss LDA across another type of nominalised clause in Basque, and show that the current proposal readily captures these LDA patterns as well. In the second part of this section, I will introduce a piece of data that is puzzling under the analysis so far, and suggest a possible direction for capturing it.

4.1.   *-tzen clauses*

LDA in Basque is not limited to *-tzea* clauses, but is also attested across another type of nomi-nalised clause, which I will refer to as *-tzen* clauses. These clauses share with the *-tzea* clauses the nominaliser *-tze*, but, unlike the latter, do not act as arguments of the matrix verb: they are not marked with any of the three argumental cases (absolutive, dative, or ergative) and do not agree with the auxiliary. They also do not include the definite article, but are rather embedded under the morpheme *-n*, which has been analysed as a marker of locative case (San Martin & Uriagereka 2002) or a postposition (Etxepare 2006; Preminger 2009). For the

sake of concreteness, I will analyse this morpheme as a P head. What is important is that this morpheme, unlike the determiner, does not head a phasal projection (Preminger 2009). The account developed here thus predicts that the absolutive person and number probes will both be able to target the embedded object directly, since there is no intervening projection that would stop the person probe from accessing the embedded argument. This, in turn, means that participant objects should be able to enter an LDA relation with the matrix auxiliary, which is exactly what we find:

(37)   [Ni   altxa-tze-n]   probatu na-ø-u-te.
         me.ABS lift-NMS-LOC attempt 1.ABS-SG.ABS-AUX-3PL.ERG
         'They attempted to lift me.'   (Preminger 2009:(17))

I propose the following derivation for this example, with both the person and the number probe targeting the embedded object:[16]

(38)
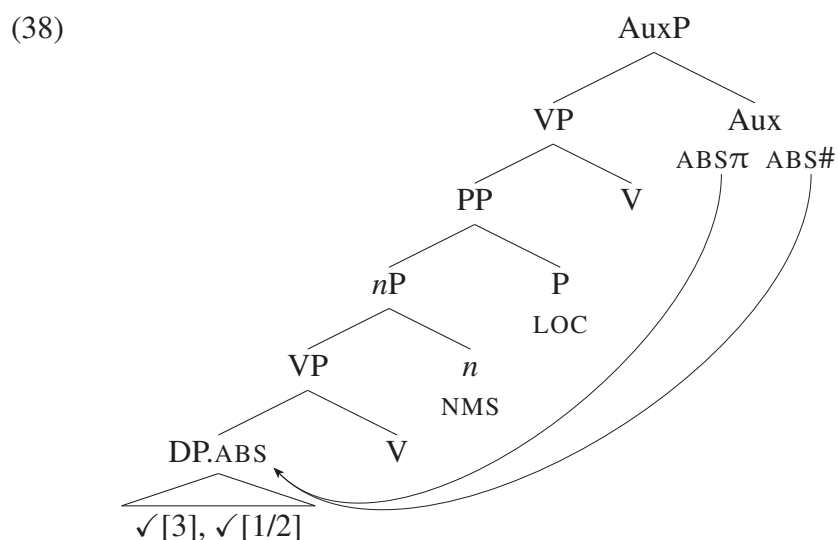
Just like absolutive *-tzea* clauses, *-tzen* clauses do not normally allow LDA with an embedded dative object (39). I suggest that the reason for this is the same: since the number and nature of the probes is linked to the number and nature of the arguments that the verb takes (Etxepare 2006), there is simply no dative probe in the matrix clause which could target a dative argument.

(39)   *Arteak   probatu   z-i-gu-n   [GURI   obeditzen].
         Artea.ERG attempted 3SG.ERG-AUX-1PL.DAT-PST   we.PL.DAT obey.NMS.LOC
         'Artea attempted to obey us.'   (R. Etxepare, p.c.)

Still, under special circumstances, an embedded dative object may be cross-referenced on the matrix auxiliary, and the same is true of dative objects embedded into absolutive-marked *-tzea* clauses. It is this puzzle to which I now turn.

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[16] The derivation is basically equivalent to the one advanced by Preminger (2009). Etxepare (2006) follows a similar line of reasoning, and draws on the absence of D_c (along with its third person feature) in *-tzen* clauses to capture these clauses' transparency for LDA with participant objects.

4.2.   Dative participants

As established above, dative arguments embedded into absolutive *-tzea* clauses and into *-tzen* clauses are, as a rule, not able to enter LDA with the matrix auxiliary. While the surfacing of dative agreement seems in fact to be entirely excluded, dative arguments may be cross-referenced by absolutive agreement morphemes if (and only if) they bear participant features. Moreover, such LDA works better if the embedded dative participant object is also plural (R. Etxepare, p.c.). In this light, consider the contrast between the ungrammatical (40) (repeated from (8)) where a third person dative object cannot agree with the matrix auxiliary, with the acceptable (41), where a participant dative object is reflected on the auxiliary by absolutive agreement morphemes. The same contrast can be observed in *-tzen* clauses, as can be seen by comparing the ungrammatical (42) with the acceptable (43).

(40)   *Erabaki d-it-u-Ø   [buruzagiei   obedi-tze-a].
         decided 3.ABS-PL.ABS-AUX-3SG.ERG   chiefs.PL.DAT obey-NMS-DET-DAT
         'He/she decided to obey the chiefs.'   (Etxepare 2006:(106))

(41)   ?Arteak   erabaki ga-it-u-ø   [GURI
         Artea.ERG decided 1.ABS-PL.ABS-AUX-3SG.ERG   we.PL.DAT
         obedi-tze-a].
         obey-NMS-DET.ABS
         'Artea decided to obey us.'   (R. Etxepare, p.c.)

(42)   *Arteak   probatu   z-it-u-en   [buruzagiei   obeditzen].
         Artea.ERG attempted 3SG.ERG-PL.ABS-AUX-PST   orders.PL.DAT obey.NMS.LOC
         'Artea attempted to obey the orders.'   (R. Etxepare, p.c.)

(43)   ?Arteak   probatu   gin-tu-ø-en   [GURI   obeditzen].
         Artea.ERG attempted 1PL.ABS-AUX-3SG.ERG-PST   we.PL.DAT obey.NMS.LOC
         'Artea attempted to obey us.'   (R. Etxepare, p.c.)

The present proposal does not so far account for these contrasts: there seems to be no reason why an absolutive probe could all of a sudden agree with an embedded dative argument. However, these data can be accommodated by including a mechanism similar to the one that underlies the phenomenon in Basque called ergative displacement (Laka 1993; Béjar & Řezáč 2009; Keine 2010; Arregi & Nevins 2008; some dialects also allow dative displacement, see Řezáč 2008). In short, some finite clauses containing a third person absolutive argument and a participant ergative (or dative) argument give rise to a special inflectional pattern: in such cases, the ergative (or dative) argument is reflected by an agreement morpheme which surfaces in the slot normally dedicated to absolutive person agreement, and the absolutive argument is only reflected by a number morpheme: compare the present tense (44-a), where ergative displacement does not happen, to the past tense (44-b), where it does.

(44)   a.   d-it-u-**t**   b.   **n**-it-u-en
              3.ABS-PL.ABS-AUX-**1SG.ERG**   **1SG.ERG**-PL.ABS-AUX-PST

Since developing a full-fledged account of ergative displacement is beyond the scope of this paper, given that it only occurs if the absolutive argument is third person, I assume that this phenomenon could be connected to the failure of the absolutive person probe. Transposing this

to the puzzle at hand, I tentatively suggest that, in LDA contexts, the matrix absolutive probes may agree with a dative object embedded into a nominalised clause if both the person and the number probe fail. In such a scenario, a second, non-case-discriminating probing cycle is attempted, and the probes can detect a dative object. If, and only if, the person probe succeeds (i.e., if the dative argument is a participant), the number probe probes as well, resulting in the ergative/dative-displacement-like phenomenon described above. The extra derivational step then yields a less natural outcome, reflected by the '?'-judgement.

5. *Summary and conclusion*

The aim of this paper was to account for the long-distance agreement (LDA) patterns attested across nominalised clauses in varieties of Basque. I have shown that it is only embedded objects that may enter an LDA dependency with the matrix auxiliary, and that the extent of the availability of LDA depends on the case of the nominalised clause and the case and featural specifications of the embedded object: absolutive clauses only allow LDA with third person absolutive objects, and dative clauses allow LDA with both absolutive and dative objects bearing any person value.

In order to derive the observed patterns, I have capitalised on the different properties of absolutive and dative probes and the implications that these properties have for the probes' interaction with the syntactic structure involved. Following Béjar & Řezáč (2009) and Preminger (2009, 2011), I have assumed that absolutive agreement arises from separate probes for person and number that look for participant and plural features, respectively, and proposed that dative agreement results from a single integral probe for both person and number looking for no particular features. Adopting the Obligatory-Operations Model (Preminger 2014), where operations can fail, and making use of the phase-unlocking possibility of Rackowski & Richards (2005), I have argued that an LDA derivation takes on a slightly different form in configurations including absolutive and dative clauses, which explains the different patterns that arise. In absolutive clauses, the person probe, looking for participant features, targets the (phasal) clausal DP. Since the clause is, evidently, not a participant, the person probe fails, yielding default agreement. At the same time, it unlocks the clausal DP for subsequent probing by the number probe, and, as a consequence of failing, restricts the range of possible goals of the number probe to third person arguments. I have motivated this restriction by the feature-geometrical approach to probe specifications (Harley & Ritter 2002; Béjar 2003) and have shown that it is needed independently of LDA. In dative clauses, the dative probe also targets the phasal clausal DP, but, having no specification for particular features, it does not fail. Still, it probes for both person and number, and, under the assumption that the clause has no specification for number, it gets only partially valued. However, its being an integral probe has two further effects: the dative probe is 'stubborn', meaning that it is able to both unlock a phase and inspect it in the same step, and it can agree with the embedded object for both person and number. The $\text{ABS} > \text{?DAT}_{\text{direct}} > \text{*DAT}_{\text{indirect}}$ LDA hierarchy across dative clauses is an outcome of the structures that these three types of object entail, the absolutive object being the most accessible, and the dative indirect object entirely inaccessible to probes from outside the clause.

To conclude, note that LDA is optional. I suggest that this may be linked to the optionality of phase-unlocking, the latter being the crucial ingredient for penetrating the clausal DP. As for the speakers for whom LDA is impossible, since phase-unlocking is needed independently

of LDA under the present analysis (to derive the Person-Case Constraint), the unavailability of LDA cannot be tied to a general absence of the phase-unlocking option for such speakers. Nevertheless, comparing the two configurations which require phase-unlocking, we can see that in the PCC examples a probe unlocks a phase contained within the same extended projection (in the sense of Grimshaw 1991), while in LDA, it needs to unlock a phase heading the next extended projection. I leave a thorough investigation of these differences for future work.

Acknowledgements

Abbreviations

1,2,3	1st, 2nd, 3rd person	LOC	locative
ABS	absolutive	NMS	nominaliser
AUX	auxiliary root	PL	plural
DAT	dative	PST	past
DET	(definite) determiner	SG	singular
ERG	ergative		

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On the syntactic position of 'why'-like 'what' in Korean

Okgi Kim

In Korean, the nominal *wh*-phrase *mwe-l* 'what-ACC' can be interpreted as a reason/causal *wh*-adjunct corresponding to *way* 'why'. The nominal *wh*-adjunct *mwe-l* behaves like *way*, and unlike its ordinary counterpart (i.e., *wh*-argument), in many respects (e.g., Intervention Effect and Anti-Superiority Effect). This paper investigates whether *mwe-l* is base-generated in the same position as the 'high' *wh*-adjunct *way* (Ko 2005, 2006). The paper argues that the nominal *wh*-adjunct *mwe-l* in an interrogative clause is directly merged into Spec-$C_{Att(itude)}P$ as its licensing position, configured lower than $C_{Int(errogative)}P$ where, according to Ko (2006), *way* is externally merged and licensed.

1. Introduction

It has been reported in the literature that a *wh*-phrase 'what', which canonically functions as an argument in a sentence, can be used as a *wh*-adjunct corresponding to 'why (the hell)' when used in a context in which the speaker is emotionally affected (e.g., being surprised) (see Kurafuji 1996; Munaro & Obenauer 1999, 2002; Holler 2009; Nakao 2009; Ochi 2004, 2015; a.o.). Such 'why'-like 'what' is not a quirk but a cross-linguistically prevalent phenomenon (English, German, Hungarian, Serbo-Croatian, Czech, French, Russian, Modern Greek, Hebrew, Bulgarian, Japanese, Chinese, Turkish, etc.). For an illustration, let us consider the following typical examples of 'why'-like 'what' in German and Japanese:

(1)   {**was/warum**} schläfst du   so lange?   (German)
         {what/why}   sleep   you so long
         'Why are you sleeping so long?'   (Ochi 2004:33)

(2)   kare-wa {**nani-o/naze**}   sawai-dei-ru   no?   (Japanese)
       he-TOP {what-ACC/why} make.noise-PROG-PRES QUE
       'Why is he making a noise?'   (Nakao 2009:241)

In the above examples, German *was* 'what' and Japanese *nani-o* 'what-ACC' receive 'why'-like interpretations and can be replaced with the regular reason *wh*-adjuncts *warum* and *naze*, respectively.[1] Korean is another language that allows for 'why'-like 'what', as exemplified in (3), where the nominal *wh*-phrase *mwe-l* 'what-ACC' is construed as a reason/causal *wh*-adverbial (here and throughout the paper, I use the term *mwe-l*[w] to refer to the nominal *wh*-adjunct *mwe-l* and distinguish it from its ordinary counterpart, i.e., *wh*-argument *mwe-l*).[2]

(3)   a.   Mimi-nun {**mwe-l**[w]**/way**}   kulehkey manhun nonmwun-ul ilk-ess-ni?
             Mimi-TOP {what-ACC/why} so   many   paper-ACC   read-PST-QUE
             'Why did Mimi read so many papers?'
       b.   ne-nun {**mwe-l**[w]**/way**}   kulehkey haymalkkey wus-ko   iss-ni?
             you-TOP {what-ACC/why} so   brightly   smile-CONN be-QUE
             'Why are you smiling so brightly?'
       c.   ellum-i {**mwe-l**[w]**/way**}   kulehkey ppalli   nok-ass-ni?
             ice-NOM {what-ACC/why} so   quickly melt-PST-QUE
             'Why did the ice melt so quickly?'

As we can see here, the 'why'-like behavior of *mwe-l*[w] is evidenced by its replacement with the regular reason *wh*-adjunct *way* 'why'. In addition, its adjuncthood is verified by its ability to occur with a direct object in a transitive clause, as in (3a), with an intransitive verb, as in (3b), and with an unaccusative verb, as in (3c).[3] As with 'why'-like 'what' in other languages (see

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[1] For detailed discussion of German 'why'-like 'what', see Munaro & Obenauer (1999, 2002) and Holler (2009). For detailed discussion of Japanese 'why'-like 'what', see Kurafuji (1996), Nakao (2009), and Ochi (2004, 2015).

[2] It is worth noting here that, unlike the regular reason *wh*-adjunct *way*, the nominal *wh*-adjunct *mwe-l*[w] cannot be licensed without accompanying an expression like *kulehkey* 'so':

(i)   a.   Mimi-nun {*__mwe-l__[w]**/way**} manhun nonmwun-ul ilk-ess-ni?
             Mimi-TOP {what-ACC/why} many   paper-ACC   read-PST-QUE
             'Why did Mimi read many papers?'
       b.   ne-nun {*__mwe-l__[w]**/way**} haymalkkey wus-ko   iss-ni?
             you-TOP {what-ACC/why} brightly   smile-CONN be-QUE
             'Why are you smiling brightly?'
       c.   ellum-i {*__mwe-l__[w]**/way**} ppalli   nok-ass-ni?
             ice-NOM {what-ACC/why} quickly melt-PST-QUE
             'Why did the ice melt quickly?'

Such a restriction also holds for German 'why'-like 'what' (Munaro & Obenauer 2002):

(ii)   {*__was__**/warum**} rennst du   *(so) schnell?
       {what/why}   run   you so   fast
       'Why are you running so fast?'

I leave this important issue to future work.

[3] The uncontracted form *mwues-ul* cannot be used as a reason *wh*-adjunct:

(i)   a.   *Mimi-nun **mwues-ul** (kulehkey) manhun nonmwun-ul ilk-ess-ni?   (cf. (3a))
             Mimi-TOP what-ACC so   many   paper-ACC   read-PST-QUE

Munaro & Obenauer 1999 and Ochi 2004, a.o.), the nominal *wh*-adjunct *mwe-l*ᵂ is used for the speaker to convey his/her emotional attitude about the propositional content expressed by the sentence. By way of example, the sentence in (3a) is best uttered in a situation in which the speaker is surprised or annoyed by the subject's unexpected behavior, i.e., the event of Mimi's reading so many papers.

Although 'why'-like 'what' in other languages has been extensively studied in the literature, the Korean counterpart has not been much discussed, except for Park & Kang (2020), with respect to its syntactic nature. To address the research gap, this paper tries to explore the syntactic characteristics of the nominal *wh*-adjunct *mwe-l*ᵂ.

As we will see, the nominal *wh*-adjunct *mwe-l*ᵂ behaves like the regular *wh*-adjunct *way*, and unlike its ordinary counterpart (i.e., *wh*-argument *mwe-l*), in many respects (e.g., Intervention Effect and Anti-Superiority Effect). In this connection, a simple but fundamental question arises as to whether the nominal *wh*-adjunct *mwe-l*ᵂ originates in the same position as the 'high' *wh*-adjunct *way* (Ko 2005, 2006). In this paper I resolve the question by arguing that the nominal *wh*-adjunct *mwe-l*ᵂ in an interrogative clause is externally merged in Spec-$C_{Att(itude)}P$ as its licensing position, configured lower than $C_{Int(errogative)}P$ where, as argued by Ko (2006), *way* is externally merged and licensed.

This paper is organized as follows. In Section 2, I present some similarities between *mwe-l*ᵂ and *way*. In Section 3, I present Ko's (2006) syntactic analysis of *way*. In Section 4, based on Ko's analysis, I offer an analysis of where *mwe-l*ᵂ is base-generated and how it is licensed. In Section 5, I conclude.

2.   *Parallels between* mwe-lᵂ *with* way
2.1.   *Island sensitivity*

As for island (in)sensitivity of *wh*-in-situ in Korean, the *wh*-adjunct *way* 'why' behaves differently from other *wh*-operators in that it is sensitive to islands. For an illustration, consider the following examples:

(4)   a.   Mimi-nun [[**mwe-l**   ilk-un]   salam]-ul   pinanhayss-ni?
             Mimi-TOP what-ACC read-MOD person-ACC criticized-QUE
             'Mimi criticized the person who read what?'
       b.   Mimi-nun [John-i   **mwe-l**   hay-se]   hwakanass-ni?
             Mimi-TOP John-NOM what-ACC do-because got.upset-QUE
             'Mimi got upset because John did what?'

(5)   a.   *Mimi-nun [[**way** ku chayk-ul ilk-un]   salam]-ul   pinanhayss-ni?
             Mimi-TOP why   the book-ACC read-MOD person-ACC criticized-QUE
             'Mimi criticized the person who read the book why?'

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             int. 'Why did Mimi read so many papers?'
       b.   *ne-nun   **mwues-ul** (kulehkey) haymalkkey wus-ko   iss-ni?   (cf. (3b))
             you-TOP what-ACC so   brightly   smile-CONN be-QUE
             int. 'Why are you smiling so brightly?'
       c.   *ellum-i **mwues-ul** (kulehkey) ppalli   nok-ass-ni?   (cf. (3c))
             ice-NOM what-ACC so   quickly melt-PST-QUE
             int. 'Why did the ice melt so quickly?'

    b. *Mimi-nun [John-i   **way** ilccik ttena-se]   hwakanass-ni?
       Mimi-TOP John-NOM why early leave-because got.upset-QUE
       'Mimi got upset because John left early why?'

As shown in (4), the *wh*-argument *mwe-l* can occur inside a complex NP island and an adjunct island, whereas, as shown in (5), the *wh*-adjunct *way* cannot.

    The nominal *wh*-adjunct *mwe-l*^{w} patterns like *way*, and unlike its ordinary counterpart, in that it is sensitive to a complex NP island, as in (6a), and an adjunct island, as in (6b).

(6)   a. *Mimi-nun [[**mwe-l^w** kulehkey manhun chayk-ul ilk-un]   salam]-ul
         Mimi-TOP what-ACC so   many   book-ACC read-MOD person-ACC
         pinanhayss-ni?
         criticized-QUE
         'Mimi criticized the person who read so many papers why?'
    b. *Mimi-nun [John-i   **mwe-l^w**   kulehkey ilccik ttena-se]   hwakanass-ni?
         Mimi-TOP John-NOM what-ACC so   early leave-because got.upset-QUE
         'Mimi got upset because John left so early why?'

2.2.   *Intervention Effect*

Korean is well-known as exhibiting the asymmetry between *way* and other *wh*-phrases with respect to the Intervention Effect: in an interrogative clause, only the former can be preceded by a Scope Bearing Element (SBE) (a.k.a. an intervener) like *man* 'only' (Beck & Kim 1997; Ko 2005; Beck 2006; among others).[4] To illustrate, consider (7) and (8).

(7)   a. *?Mimi-man **mwe-l**   ilk-ess-ni?
         Mimi-only what-ACC read-PST-QUE
         'What did only Mimi read?'
    b. **mwe-l**   Mimi-man ilk-ess-ni?
         what-ACC Mimi-only read-PST-QUE
         'What did only Mimi read?'

(8)   a. Mimi-man **way** manhun nonmwun-ul ilk-ess-ni?
         Mimi-only why many   paper-ACC   read-PST-QUE
         'Why did only Mimi read so many papers?'
    b. **way** Mimi-man manhun nonmwun-ul ilk-ess-ni?
         why Mimi-only many   paper-ACC   read-PST-QUE
         'Why did only Mimi read so many papers?'

The sentence in (7a) is ruled out because the *wh*-object *mwe-l* is preceded by the subject SBE *Mimi-man*. However, as shown in (7b), if the *wh*-object undergoes overt scrambling over the subject SBE to avoid the intervention configuration (i.e., being c-commanded by an SBE), the result becomes well-formed. On the other hand, as shown in (8), the *wh*-adjunct *way*, unlike the *wh*-argument, is able to precede or follow the SBE.

    Example (9) illustrates that the nominal *wh*-adjunct *mwe-l*^{w} can be c-commanded by an SBE

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[4] SBEs also include *amwuto* 'anyone', *anh* 'not', *pakkey* 'only' (NPI), *to* 'also', *nwukwunka* '(non-specific) someone', and *nwukwuna* 'everyone'. See Ko (2005) for relevant examples.

in an interrogative clause, just like *way* and unlike its ordinary counterpart.

(9)   a.   Mimi-man **mwe-lʷ**   kulehkey manhun nonmwun-ul ilk-ess-ni?
              Mimi-only what-ACC so   many   paper-ACC   read-PST-QUE
              'Why did only Mimi read so many papers?'
        b.   **mwe-lʷ**   kulehkey manhun nonmwun-ul Mimi-man ilk-ess-ni?
              what-ACC so   many   paper-ACC   Mimi-only read-PST-QUE
              'Why did only Mimi read so many papers?'

2.3.   Anti-Superiority Effect

Another peculiar behavior of the *wh*-adjunct *way* concerns the fact that, unlike other *wh*-phrases, it cannot precede the other *wh*-phrase in a multiple *wh*-question, which is known as the Anti-Superiority Effect (Saito 1994; Watanabe 1992; Ko 2006):

(10)   a.   nwu-ka   **mwe-l**   ilk-ess-ni?
              who-NOM what-ACC read-PST-QUE
              'Who read what?'
        b.   **mwe-l**   nwu-ka   ilk-ess-ni?
              what-ACC who-NOM read-PST-QUE
              'Who read what?'

(11)   a.   John-i   nwukwu-lul **way** manna-ss-ni?
              John-NOM who-ACC   why meet-PST-QUE
              'Who did John meet why?'
        b.   *John-i   **way** nwukwu-lul manna-ss-ni?
              John-NOM why who-ACC   meet-PST-QUE
              'Who did John meet why?'

(10) shows that the *wh*-argument *mwe-l* can freely precede or follow the other *wh*-argument *nwu-ka* in the multiple *wh*-question. On the other hand, the contrast in (11) illustrates that the *wh*-adjunct *way* must follow the other *wh*-argument *nwukwu-lul*.

In terms of the Anti-Superiority Effect, the nominal *wh*-adjunct *mwe-lʷ* behaves on a par with *way*, but not with its ordinary counterpart. Consider (12).

(12)   a.   nwukwu-lul **mwe-lʷ**   kulehkey manhi chotayhayss-ni?
              who-ACC   what-ACC so   many invited-QUE
              lit. 'Who did you invite so many why?'
        b.   ***mwe-lʷ**   kulehkey manhi nwukwu-lul chotayhayss-ni?
              what-ACC so   many who-ACC   invited-QUE
              lit. 'Who did you invite so many why?'

As seen in the contrast in (12), the nominal *wh*-adjunct *mwe-lʷ* is not allowed to precede the other *wh*-phrase in a multiple *wh*-question.

2.4. Wh-words as existential QPs

It is known that in Korean a *wh*-argument can function as an existential Quantificational Phrase (QP) when used in a clause with a declarative mood marker *ta*, as in (13a), whereas the *wh*-adjunct *way* cannot, as in (13b) (Park 2010).

(13)   a. **nwu-ka**   **mwe-l**   ilk-ess-ta.
          someone-NOM what-ACC read-PST-DECL
          'Someone read something.'
    b. *John-i   **way** manhun nonmwun-uli ilk-ess-ta.
          John-NOM why many   paper-ACC   read-PST-DECL
          int. 'John read many papers for some reason.'

Note that it is impossible for the nominal *wh*-adjunct *mwe-l^w* to function as an existential QP, like *way* and unlike its ordinary counterpart:

(14)   *John-i   **mwe-l^w**   kulehkey manhun nonmwun-ul ilk-ess-ta.
       John-NOM what-ACC so   many   paper-ACC read-PST-DECL
       int. 'John read so many papers for some reason.'

2.5. (In)compatibility with an embedded infinitival clause

Unlike other *wh*-operators, the *wh*-adjunct *way* cannot be merged within an infinitival clause selected by a matrix predicate like *sultukha* 'persuade' and *myenglyengha* 'order', as illustrated in (15) (Ko 2005).

(15)   a. John-un Mimi$_i$-eykey [PRO$_i$ **mwe-l**   ilk-ulako]
          John-TOP Mimi-DAT   what-ACC read-COMP
          {seltukha/myenglyengha}-yss-ni?
          persuade/order-PST-QUE
          'What did John {persuade/order} Mimi to read?'
    b. *John-un Mimi$_i$-eykey [PRO$_i$ **way** ku sosel-ul   ilk-ulako]
          John-TOP Mimi-DAT   why that novel-ACC read-COMP
          {seltukha/myenglyengha}-yss-ni?
          persuade/order-PST-QUE
          'What is the reason x such that John {persuaded/ordered} Mimi to read that novel for that reason x?' (long-distance reading)

In the *way*-sentence (15b), the long-distance reading, where *way* is interpreted within the embedded infinitival clause, is unavailable. However, as in (16), if it is associated with the matrix interrogative clause, the sentence becomes felicitous.

(16)   John-un Mimi$_i$-eykey **way** [PRO$_i$ ku sosel-ul   ilk-ulako]
       John-TOP Mimi-DAT   why   that novel-ACC read-COMP
       seltukha/myenglyengha-yss-ni?
       persuade/order-PST-QUE

'What is the reason x such that for x John persuaded/ordered Mimi to read that novel?' (matrix reading)

Example (17) indicates that, like *way* and unlike its ordinary counterpart, the nominal *wh*-adjunct *mwe-l^w* is incompatible with an embedded infinitival clause.

(17) a. *John-un Mimi$_i$-eykey [PRO$_i$ **mwe-l^w** kulehkey cacwu ku sosel-ul
          John-TOP Mimi-DAT   what-ACC so   often   that novel-ACC
          ilk-ulako]   seltukha/myenglyengha-yss-ni?
          read-COMP persuade/order-PST-QUE
          'What is the reason x such that John persuaded/ordered Mimi to read that novel
          so often for that reason x?' (long-distance reading)
      b. John-un Mimi$_i$-eykey **mwe-l^w** kulehkey cacwu [PRO$_i$ ku sosel-ul
          John-TOP Mimi-DAT   what-ACC so   often   that novel-ACC
          ilk-ulako]   seltukha/myenglyengha-yss-ni?
          read-COMP persuade/order-PST-QUE
          'What is the reason x such that for x John so often persuaded/ordered Mimi to
          read that novel?' (matrix reading)

3. *Ko (2006): the external merge of* way *in Spec-C$_{Int}$P*

We have observed in the previous section that, unlike other *wh*-operators, the *wh*-adjunct *way* exhibits the Anti-Superiority Effect in that it cannot be followed by the other *wh*-phrase in a multiple *wh*-question. To account for the Anti-Superiority Effect, Ko (2006), following Rizzi's (1999) split-CP hypothesis, assumes that the *wh*-adjunct *way* in an interrogative clause is externally merged in its checking/scope position, Spec-C$_{Int}$P, as illustrated in (18a), while other *wh*-phrases undergo LF movement to Spec-C$_{Foc}$P, configured higher than C$_{Int}$P, for feature checking, as illustrated in (18b).[5]

(18) a. [$_{CP}$ C$_{Foc[+Q]}$ ... **way** C$_{Int[+Q]}$ [$_{IP}$ ...]]
      b. [$_{CP}$ **wh$_i$** C$_{Foc[+Q]}$ ... C$_{Int[+Q]}$ [$_{IP}$ ... t$_i$ ...]]

Ko further assumes that the *wh*-adjunct *way* is an SBE that induces the Intervention Effect that she takes as a LF-constraint on *wh*-movement, where a *wh*-phrase cannot move to its checking/scope position across an SBE, as illustrated in (19) (see also Ko 2005; cf. Beck and Kim 1997; Beck 2006).[6]

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[5] The *wh*-adjunct *way* also can be externally merged in an embedded declarative clause. In this case, however, it needs to move covertly to the matrix interrogative clause to check off its [uWH] feature.

[6] Building on Bromberger (1992), Ko (2006) viewes *way* as an SBE given that it induces focus association, where the answer to a *way*-question differs depending on the association between *way* and a focus-marked phrase with emphatic stress, as in (i).

(i)   a. A: Adam-un   way kulehkey manhun sakwa-lul mek-ess-ni?
             Adam-NOM why so   many   apple-ACC eat-PST-QUE
             'Why did Adam eat so many apples?'
          B: hanunim-i kukes-ul uytohasiessu-nikka
             God-NOM that-ACC intend-because
             'Because God intended it (to happen).'

(19)   [... $\sqrt{}$ C$_{[+Q]}$ SBE **wh** ...]

On Ko's analysis, the ungrammatical example in (11b) regarding the Anti-Superiority Effect, repeated here as (20), is explained in the following way: the SBE *way* externally merged in Spec-C$_{Int}$P triggers the Intervention Effect by interfering with LF movement of the *wh*-argument *nwukwu-lul* to Spec-C$_{Foc}$P, higher than C$_{Int}$P, as illustrated in (21).

(20)   *John-i   **way** nwukwu-lul manna-ss-ni?
         John-NOM why who-ACC   meet-PST-QUE
         'Who did John meet why?'

(21)   [$_{CP}$ C$_{Foc[+Q]}$ ... **way** C$_{Int[+Q]}$ [$_{IP}$ ... **nwukwu-lul** ...]]

Ko' analysis further gives a straightforward account of why the *wh*-adjunct *way*, unlike other *wh*-operators, does not exhibit the Intervention Effect when it is c-commanded by an SBE. The relevant examples are repeated below in (22).

(22)   a. *?Mimi-man **mwe-l**   ilk-ess-ni?
            Mimi-only what-ACC read-PST-QUE
            'What did only Mimi read?'
        b. Mimi-man **way** manhun nonmwun-ul ilk-ess-ni?
            Mimi-only why many   paper-ACC   read-PST-QUE
            'Why did only Mimi read many papers?'

The ungrammaticality of (22a) is because the LF movement of the *wh*-argument *mwe-l* to Spec-C$_{Foc}$P violates the Intervention Effect constraint: it moves across the SBE *Mimi-man* that c-commands it, as illustrated in (23).

(23)   [$_{CP}$ C$_{Foc[+Q]}$ ... [$_{IP}$ Mimi-man   **mwe-l** ...]]

Meanwhile, the well-formedness of (22b) is because *way* does not undergo LF movement across the c-commanding scrambled SBE as it is licensed in its base-generated position, Spec-C$_{Int}$P, as illustrated in (24).

(24)   [$_{CP}$ C$_{Foc[+Q]}$ ... Mimi-man$_i$ **way** C$_{Int[+Q]}$ [$_{IP}$ ... t$_i$ ...]]

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        b.   A: ADAM-un way kulehkey manhun sakwa-lul mek-ess-ni?
              B: Ivu-ka   Adam-eykey kwonhayssu-nikka
               Eve-NOM Adam-DAT   recommended-because
               'Because he was the one that Eve recommended (to eat the apple).'
        c.   A: Adam-un way kulehkey manhun SAKWA-lul mek-ess-ni?
              B: kukes-i   cwupyeney iss-ten   yulihan umsik iessu-nikka
               that-NOM around   be-MOD only   food   be-because
               'Because it (the apple) was the only food around.'
        d.   A: Adam-un way kulehkey manhun sakwa-lul MEK-ess-ni?
              B: kukes-ulo mwues-ul halci mollassu-nikka
               that-with   what-ACC to.do be.ignorant.of-because
               'Because he couldn't think of anything else to do with it.'

4. Proposal
4.1. LF movement to Spec-$C_{Foc}P$ or external merge in Spec-$C_{Int}P$?

Based on Ko's analysis discussed above, the following two hypotheses can be made in analyzing the nominal *wh*-adjunct *mwe-l*^{w} with regard to where it originates and whether it undergoes LF movement: The first hypothesis is that given that the nominal *wh*-adjunct *mwe-l*^{w} has the same form as the nominal *wh*-argument *mwe-l*, it is hypothesized that, like other *wh*-operators, *mwe-l*^{w} moves at LF from its base position to Spec-$C_{Foc}P$ to take scope. The second hypothesis is that given that the nominal *wh*-adjunct *mwe-l*^{w} behaves like *way* in many respects, it is hypothesized that *mwe-l*^{w} is externally merged at Spec-$C_{Int}P$ and licensed there. In what follows, however, I show that the two hypotheses are not borne out.

As we have examined in (9a), repeated below as (25), the nominal *wh*-adjunct *mwe-l*^{w} does not exhibit the Intervention Effect, i.e., it is able to follow an SBE in an interrogative clause.

(25)   Mimi-man **mwe-l^w**   kulehkey manhun nonmwun-ul ilk-ess-ni?
        Mimi-only what-ACC so   many   paper-ACC   read-PST-QUE
        'Why did only Mimi read so many papers?'

If we assume that *mwe-l*^{w} undergoes LF movement to Spec-$C_{Foc}P$, just as its ordinary counterpart (i.e., *wh*-argument *mwe-l*) does, then it should be subject to the Intervention Effect when c-commanded by an SBE, since its LF movement is blocked by the c-commanding SBE; however, this is not the case, as seen in (25). Thus, the first hypothesis is not borne out.

Example (26) illustrates that *way* and *mwe-l*^{w} can cooccur in an interrogative clause and that a phrasal element can intervene between the two *wh*-expressions.

(26)   a.   way Mimi-man **mwe-l^w**   kulehkey manhun nonmwun-ul ilkess-ni?
              why Mimi-only what-ACC so   many   paper-ACC   read-QUE
              'Why did only Mimi read so many papers?'
        b.   way sakwa-lul **mwe-l^w**   kulehkey ppalli   mekess-ni?
              why apple-ACC what-ACC so   quickly ate-QUE
              'Why did you eat the apple so quickly?'

If the nominal *wh*-adjunct *mwe-l*^{w} is taken to be externally merged into the same licensing position as *way*, i.e., Spec-$C_{Int}P$, then no element can occur between *way* and *mwe-l*^{w}, contrary to fact. This observation thus suggests that the second hypothesis is also not borne out. Meanwhile, the data like (26) also support the claim that *mwe-l*^{w} does not undergo LF movement to Spec-$C_{Foc}P$: if *mwe-l*^{w} is licensed in the same way as its ordinary counterpart, (26) should be ungrammatical, contrary to fact, since the SBE *way* (and *Mimi-man*) block LF-movement of *mwe-l*^{w} to Spec-$C_{Foc}P$.

4.2. External merge of mwe-l^w in Spec-$C_{Att}P$

Here I propose that, unlike its ordinary counterpart, the nominal *wh*-adjunct *mwe-l*^{w} originates in the left periphery of the clause. Specifically, adapting Munaro & Obenauer's (2002) suggestion that 'why'-like 'what' in French and Pagotto occupies Spec-Att(itude)P, I propose that *mwe-l*^{w} in an interrogative clause is externally merged in Spec-$C_{Att}P$ as its checking position, configured

lower than $C_{Int}P$ in which *way* is externally merged and licensed. This is illustrated in (27).

(27) $[_{CP}$ $C_{Foc[+Q]}$ ... **way** $C_{Int[+Q]}$ ... **mwe-l^w** $C_{Att[+Q]}$ ... $[_{IP}$ ... $]]$

I follow Munaro & Obenauer (2002) in claiming that the functional projection $C_{Att}P$ encodes the speaker's attitude about the propositional content expressed by the sentence. The postulation of the existence of independent functional projection for 'why'-like 'what' has also been made by other researchers: Pan (2014) postulates a Surprise-Disapproval Question-P for Chinese 'why'-like 'what', and Nakao & Obata (2009) a Functional Projection in the left periphery. As indicated in (27), I assume that, as with C_{Foc} and C_{Int}, the functional head C_{Att} in an interrogative clause contains the [+Q] feature that checks off the [uWH] feature of *mwe-l^w* sitting in its specifier position via Spec-Head agreement. If *mwe-l^w* originates in Spec-$C_{Att[-Q]}P$ of an embedded declarative clause, it is required to undergo LF movement to the matrix interrogative $C_{Att[+Q]}P$ to check off its [uWH] feature.

The external merge of *mwe-l^w* in Spec-$C_{Att}P$ gives a straightforward account of why it always has a wide scope reading over negation, as shown in (28), just as *way* does (Ko 2005).

(28)   John-un {**mwe-l^w/way**}   kulehkey swipkey cichi-cito   ahn-ni?
         John-TOP {what-ACC/why} so   easily   get.tired-CONN not-QUE
         'What is the reason x such that John does not get tired so easily?'
         *'What is not the reason x such that John gets tired so easily for x?'

Under the present analysis, the obligatory wide scope reading of *mwe-l^w* over negation is attributed to the fact that it does not bind any variable below NegP as it is directly merged in the split-CP domain (Spec-$C_{Att}P$).

Another advantage of the proposed analysis is that it accounts for the peculiar behavior of the nominal *wh*-adjunct *mwe-l^w* with respect to the Intervention Effect and the Anti-Superiority Effect: that is, like *way*, it can be preceded by an SBE in an interrogative clause and is unable to precede the other *wh*-phrase in a multiple *wh*-question. The relevant examples are repeated below:

(29)   Mimi-man **mwe-l^w**   kulehkey manhun nonmwun-ul ilk-ess-ni?
         Mimi-only what-ACC so   many   paper-ACC   read-PST-QUE
         'Why did only Mimi read so many papers?'

(30)   ***mwe-l^w**   kulehkey manhi nwukwu-lul chotayhayss-ni?
         what-ACC so   many who-ACC   invited-QUE
         lit. 'Who did you invite so many why?'

In (29), the nominal *wh*-adjunct *mwe-l^w* does not show the Intervention Effect even though it is c-commanded by the scrambled SBE *Mimi-man*. This follows from the fact that *mwe-l^w* does not move at LF as it is initially licensed in its base position (Spec-$C_{Att}P$), as illustrated in (31).

(31) $[_{CP}$ $C_{Foc[+Q]}$ ... $C_{Int[+Q]}$ ... Mimi-man$_i$ **mwe-l^w** $C_{Att[+Q]}$ ... $[_{IP}$ ... t_i ... $]]$

In (30), the *wh*-argument *nwukwu-lul* cannot follow *mwe-l^w*. This can be explained by further assuming that, like *way*, *mwe-l^w* functions as an SBE that induces the Intervention Effect: that is, the LF movement of the *wh*-argument to Spec-$C_{Foc}P$ is blocked by the SBE *mwe-l^w* base-

generated in Spec-C$_{Att}$P, as illustrated in (32).[7]

(32)   [$_{CP}$ C$_{Foc[+Q]}$ ... C$_{Int[+Q]}$ ... **mwe-l^w** C$_{Att[+Q]}$ ... [$_{IP}$ ... **nwukwu-lul** ...]]

The external merge of *mwe-l^w* in Spec-C$_{Att}$P, configured lower than C$_{Int}$P, can account for its co-occurrence with the c-commanding *way* in an interrogative clause, as we have seen in (26), repeated below as (33).[8]

(33)   a.   **way** Mimi-man **mwe-l^w** kulehkey manhun nonmwun-ul ilkess-ni?
              why Mimi-only what-ACC so   many   paper-ACC   read-QUE
              'Why did only Mimi read so many papers?'
        b.   **way** sakwa-lul **mwe-l^w** kulehkey ppalli   mekess-ni?
              why apple-ACC what-ACC so   quickly ate-QUE
              'Why did you eat the apple so quickly?'

Meanwhile, in the above examples, the nominal *wh*-adjunct *mwe-l^w* cannot be replaced by *way*:

(34)   a.   ***way** Mimi-man **way** kulehkey manhun nonmwun-ul ilkess-ni?
              why Mimi-only why so   many   paper-ACC   read-QUE
              'Why did only Mimi read so many papers?'
        b.   ***way** sakwa-lul **way** kulehkey ppalli   mekess-ni?
              why apple-ACC why so   quickly ate-QUE
              'Why did you eat the apple so quickly?'

The sentences in (34) are ruled out because the two *way*s compete for the same licensing position (Spec-C$_{Int}$P). The contrast between (33) and (34) then lends credence to the claim that the nominal *wh*-adjunct *mwe-l^w* is externally merged and licensed in a distinct functional projection

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[7] The treatment of the nominal *wh*-adjunct *mwe-l^w* as an SBE may be supported by the fact that like *way*, it gives rise to focus affected readings, as illustrated in (i).

(i)   a.   A: Adam-un   mwe-l^w kulehkey manhun sakwa-lul mek-ess-ni?
              Adam-NOM what-ACC so   many   apple-ACC eat-PST-QUE
              'Why did Adam eat so many apples?'
           B: hanunim-i kukes-ul uytohasiessu-nikka
              God-NOM that-ACC intend-because
              'Because God intended it (to happen).'
       b.   A: ADAM-un mwe-l^w kulehkey manhun sakwa-lul mek-ess-ni?
           B: Ivu-ka   Adam-eykey kwonhayssu-nikka
              Eve-NOM Adam-DAT   recommended-because
              'Because he was the one that Eve recommended (to eat the apple).'
       c.   A: Adam-un mwe-l^w kulehkey manhun SAKWA-lul mek-ess-ni?
           B: kukes-i   cwupyeney iss-ten   yulihan umsik iessu-nikka
              that-NOM around   be-MOD only   food be-because
              'Because it (the apple) was the only food around.'
       d.   A: Adam-un mwe-l^w kulehkey manhun sakwa-lul MEK-ess-ni?
           B: kukes-ulo mwues-ul halci mollassu-nikka
              that-with what-ACC to.do be.ignorant.of-because
              'Because he couldn't think of anything else to do with it.'

[8] I leave to future research the semantic issue of how a single 'why' meaning is derived from two reason *wh*-adjuncts in an interrogative clause.

in the left periphery, namely $C_{Att}P$ in the present analysis.

5.   *Conclusion*

This paper has investigated the syntactic aspects of nominal *wh*-adjunct *mwe-l*ʷ, with a focus on the question of where it is base-generated and how it is licensed. Building on Ko's (2006) analysis of *wh*-licensing in Korean, I have proposed that the nominal *wh*-adjunct *mwe-l*ʷ in an interrogative clause is externally merged in Spec-$C_{Att}P$ as its checking position, configured lower than $C_{Int}P$ where the regular *wh*-adjunct *way* is licensed. I have shown that the proposed analysis can account for the regular as well as idiosyncratic properties of *mwe-l*ʷ. If this cartographic analysis (i.e., the existence of $C_{Att}P$ that encodes the speaker's emotional attitude) is on the right track, it supports Rizzi's (1997) view that each interpretively relevant feature is encoded in an individual functional head (projection) in the split-CP structure.

Acknowledgements

Abbreviations

NOM	nominative	PST	past
ACC	accusative	CONN	connective
TOP	topic	MOD	modifier
QUE	question	PL	plural
PRES	present	DECL	declarative
PROG	progressive	COMP	complementizer
DAT	dative		

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Vereinigte Staaten von Amerika

An analysis of Kennedy and Reagan's speeches on the Berlin Wall

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The present paper offers a content and pragmatic analysis of John F. Kennedy and Ronald Reagan's speeches on the Berlin Wall with the aim of providing the reader with a complete investigation on the meaning. As far as the content analysis is concerned, this study compares the seduction strategies and rhetorical means as well as the main themes and lexemes recurring in these speeches. With respect to pragmatic analysis, the investigation focuses on linguistic implicitating strategies conveying debatable notions. Results show that both presidents frequently employed such strategies in their speeches.

1. Introduction

This paper aims at conducting an analysis of John F. Kennedy and Ronald Reagan's speeches on the Berlin Wall, which are two of the most famous discourses of all time. Kennedy and Reagan gave their speeches in West Berlin respectively on June 26, 1963 and June 12, 1987. As Collier (2014:184) points out, presidential speeches have become generally the central focus of both media coverage and scholarly treatments of the presidency of the United States. Indeed, the Berlin Wall crisis dominated the presidencies of Kennedy and Reagan, even if for different reasons.[1] As a matter of fact, Smyser (2009:xiii) observes that the Berlin Wall situation was on Kennedy's mind all day long and it forced him to mature. For his part, Reagan was dealing with the Berlin Wall crisis in relation to the debate of placing short-range missiles in Europe.

Due to the importance of these speeches, we present a content and pragmatic analysis of these two speeches, in order to help individuate what made them so successful. The reason for such analyses from these two perspectives is the belief that no investigation on meaning can be complete if it does not consider these two dimensions.[2] In our opinion, it is important to present a linguistic analysis of these Berlin Wall speeches, since, on the one hand, the Berlin Wall crisis was analyzed mostly from a sociological and political point of view, and on the other linguistic analysis of Kennedy and Reagan's language has so far dealt with their public speeches in

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[1] In particular, see Smyser (2009) for a deep analysis of Kennedy's role in the Berlin Wall crisis.

[2] For the importance of the cooperation between semantics and pragmatics in textual analysis see Levinson (1983), Pollack & Pereire (1988), Jaszczolt (2002).

general and not only with the Berlin ones (Geis 1987, Metcalf 2004, Humes 2010, Collier 2014, Lehrman 2017).

2. A content analysis of the Berlin speeches
2.1. The methodology of the analysis

In the first half of this paper, Kennedy and Reagan's speeches are analyzed according to the method of the *content analysis*, the purpose of which is studying documents contained in text corpora and, in particular, organizing and eliciting meaning from the collected data (see Krippendorff 2004, Drisko & Maschi 2016). Therefore, the paper focuses on one hand on the (1) seduction strategies and rhetorical means that were employed in these Berlin speeches – for which the texts were to be analyzed in the look-out for a common discursive strategy (i.e. strategy meant to be a systematic way of using language for social, political and linguistics aim, cf. Wodak 2005) – and on the other on the (2) main recurring themes and lexemes. The second part of the content analysis was realized with the help of software as Sketch Engine[3] and Leximancer[4], which are two useful instruments for this kind of research.

2.2. Seduction strategies and rhetorical means

As far as Kennedy's style is concerned, it is undeniable that his main aim is keeping the attention of his audience high, as much as appealing constantly to the public. As a matter of fact, Kennedy aimed at making the speech understandable, since he wanted to communicate an identity close to the one of the people (Geis 1987:38 ff.; Savoy 2017; Lehrman 2017:12ff.). Therefore, in this section we examine some seduction strategies and rhetorical means which have been used in political speeches for centuries (Mortara Garavelli 1988, 2010).

The Berlin speech given by Kennedy in West Berlin on June 26, 1963 appears to be characterized by:

(1)   *Anaphoras*
        a. "**I am proud** to come to this city. […] **I am proud** to visit the Federal Republic";
        b. "**There are some who say** that communism is the wave of the future. **There are some who say** in Europe and elsewhere we can work with the Communists";
        c. "On behalf of my countrymen, **who** live many miles away on the other side of the Atlantic, **who** are far distant from you";
        d. "**Beyond** the dangers of today, **beyond** the freedom merely of this city of Berlin, **beyond** the wall to the day of peace with justice, **beyond** yourselves and ourselves to all mankind").

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[3] *Sketch Engine* (https://www.sketchengine.eu/) is a content analysis-oriented software, developed in 2003 by Lexical Computing Limited. The software offers some features, such as *word sketch* (automatic summary of a word's grammatical behavior and of its collocations), *n-grams* (frequency lists of multi-word expressions) and *keyword extraction* (automatic extraction of key words and multi-word terms). See Kilgarriff *et al*. (2004), Kilgariff *et al*. (2014).

[4] *Leximancer* (https://www.leximancer.com/) is a text-mining software which leads conceptual analysis of texts according to the criteria of the content analysis. Leximancer works on text corpora and classifies the main themes and concepts by organizing them in a semantic network and, consequently, in a concept map. See Smith (2003), Smith and Humphrey (2006).

(2)   *Bicolons and tricolons*
    a. "Who has committed Germany **to democracy and freedom and progress**";
    b. "I know of **no town**, **no city**";
    c. "that still lives with **the vitality and the force**, and **the hope and the determination** of the city of West Berlin";
    d. "In 18 years of **peace and good faith**").

(3)   *Repetition of sentences*
    a. "Let them come to Berlin" x4;

(4)   *Juxtaposition of contrasting concepts, such as the West and the Soviet realities*
    a. "There are many people in the world who don't understand what is the great issue between the **free world** and the **Communist world**")
    and collective and individual actions
    b. "When one man is enslaved, all are not free) (see Dean 1991: 536 ff.);

(5)   *Frequent use of the pronoun "we"*
    a. "**We** have never had to put a wall up";
    b. "**We** take no satisfaction in it";
    c. "Then **we** can look forward to that day".

(6)   *Use of formulas in German*
    a. "Ich bin ein Berliner";
    b. "Lass' sie nach Berlin kommen".

(7)   *Direct appeal to the public – with the pronoun* you
    a. "They have been able to share with **you** the story of the last 18 years";
    b. "So let me ask **you** as I close".

(8)   *Reference to far and recent history*
    a. "Two thousand years ago the proudest boast was «civis Romanus sum»";
    b. "They have been able to share with you the story of the last 18 years";
    c. "In 18 years of peace and good faith, this generation of Germans has earned the right to be free").

In the same way as John F. Kennedy, in his speeches Ronald Reagan meant to keep the attention of the auditory high and to establish a direct contact with the public. Differently from Kennedy's, Reagan's speeches are characterized by active and offensive strategies. Moreover, his ability of talking on camera is particularly renowned – he was a former Hollywood actor – that led to passionate speeches. It is no coincidence that Reagan gained the sobriquet of "the Great Communicator". Therefore, the importance of the text contents delivered by Reagan has to be considered (Metcalf 2004; Humes 2010; Savoy 2017).

    In Reagan's Berlin speech –given on June 12, 1987 – the presence of the following rhetorical means and seduction strategies stand out:

(9)   *Anaphoras*
    a. "**Still** a restriction on the right to travel, **still** an instrument to impose upon ordinary men and women the will of a totalitarian state";
    b. "**As long as** this gate is closed, **as long as** this scar of a wall is permitted to stand";
    c. "**From** devastation, **from** utter ruin";
    d. "**Yes** to the city, **yes** to the future, **yes** to the freedom");

(10)   *Bicolons and tricolons*
    a. "Speaking to the people **of this city and the world**";
    b. "It is being **seen and heard** as well in the East";

     c.   "There may be **no visible**, **no obvious** wall";

     d.   "**The news photo and the television screen** have imprinted this brutal division of a continent";

     e.   "I understand **the fear of war and the pain of division**";

     f.   "We seek to increase the safety **of Europe and all the world**";

     g.   "Finding ways of making commercial air service to Berlin **more convenient, more comfortable, and more economical**").

(11) *Juxtaposition of contrasting concepts, such as the past and the present*

     a.   "Where four decades ago there was rubble, today in West Berlin there is the greatest industrial output of any city";

     b.   "Where a city's culture seemed to have been destroyed, today there are two great universities";

     c.   "When President Kennedy spoke at the City Hall those 24 years ago, freedom was encircled, Berlin was under siege. And today, despite all the pressures upon this city, Berlin stands secure in its liberty".

    or the West and the Soviet realities

     d.   "We in the West must resist Soviet expansion";

     e.   "Perhaps this gets to the root of the matter, to the most fundamental distinction of all between East and West";

     f.   "The totalitarian world produces backwardness because it does such violence to the spirit, thwarting the human impulse to create, to enjoy, to worship. […] There in Berlin, like the city itself, symbols of love, symbols of worship, cannot be suppressed".

(12) *Frequent use of the pronoun "we"*

     a.   "**We** come to Berlin, **we** American Presidents";

     b.   "**We** welcome change and openness; for **we** believe that freedom and security go together";

     c.   "**We** in the West stand ready to cooperate with the East to promote true openness";)

    and of the pronoun "I"

     d.   "And today **I**, myself, make my second visit to your city";

     e.   "But **I** must confess";

     f.   "For **I** join you, as **I** join your fellow countrymen in the West";

     g.   "**I** understand that Berliners of my own generation can remember seeing signs";

     h.   "And I invite Mr. Gorbachev").

(13) *Use of formulas in German*

     a.   "Ich hab' noch einen Koffer in Berlin";

     b.   "Es gibt nur ein Berlin";

     c.   "the Wirtschaftswunder";

     d.   "Berliner Herz, Berliner Humor, ja, und Berliner Schnauzer");

(14) *Direct appeal to the public*

     a.   "Thank you very much. Chancellor Kohl, Governing Mayor Diepgen, ladies and gentlemen";

     b.   "To those listening throughout Eastern Europe, I extend my warmest greetings and the good will of the American people";

     c.   "Thank you and God bless you".

(15) *Reference to far and recent history*

     a.   "By the feeling of history in this city, more than 500 years older than our nation";

b. "In the season of spring in 1945, the people of Berlin emerged from their air raid shelters to find devastation";

c. "Adenauer, Erhard, Reuter, and other leaders understood the practical importance of liberty";

d. "The German leaders reduced tariffs, expanded free trade, lowered taxes";

e. "Beginning 10 years ago, the Soviets challenged the Western alliance with a grave new threat";

(16) *Famous quotes*

a. "Perhaps the composer, Paul Lincke, understood something about American Presidents";

b. "President von Weizsacker has said: «The German question is open as long as the Brandenburg Gate is closed»";

c. "Speaking precisely 40 years ago this month, he [George Marshall] said «Our policy is directed not against any country or doctrine, but against hunger, poverty, desperation, and chaos»";

d. "In the 1950s, Khrushchev predicted: «We will bury you»");

(17) *Memorable phrases*

a. "General Secretary Gorbachev, if you seek peace, if you seek prosperity for the Soviet Union and Eastern Europe, if you seek liberalization: Come here to this gate! Mr. Gorbachev, open this gate! Mr. Gorbachev, tear down this wall!".

(18) *Words denoting Action*

a. "We see a free world that has **achieved** a level of prosperity and well-being";

b. "We seek to **increase** the safety of Europe";

c. "Let us **maintain** and **develop** the ties between the Federal Republic and the Western sectors of Berlin");

(19) *Ironic expressions*

a. "The Soviets didn't count on Berliner Herz, Berliner Humor, ja, und Berliner Schnauzer");

(20) *Hypophoras*

a. "Are these the beginnings of profound changes in the Soviet states? Or are they token gestures, intended to raise false hopes in the West, or to strengthen the Soviet system without changing it?";

b. "And what better way to demonstrate to the world the openness of this city than to offer in some future year to hold the Olympic games here in Berlin, East and West?";

c. "What keeps you here? Certainly there's a great deal to be said for your fortitude, for your defiant courage".

In view of these results, it seems possible to assert that Kennedy's style is more impersonal, but in any case he managed to communicate clearly with his public, whilst Reagan's one is more personal, as evident from his frequent use of use of quotes, words denoting Action, memorable phrases and of the pronoun *I*.

2.3. Main themes and most recurring lexemes

A great deal about these Berlin speeches can be said also by looking at the main recurring themes. Kennedy's speech focuses on themes such as:

(21) *freedom*
    a. "Today, in the world of freedom";
    b. "Freedom has many difficulties and democracy is not perfect";
    c. "One German out of four is denied the elementary right of free men, and that is to make a free choice";
    d. "All free men, wherever they may live, are citizens of Berlin";
(22) *West Berlin and its citizens*
    a. "The fighting spirit of West Berlin";
    b. "Ich bin ein Berliner";
    c. "I know of no town, no city, that has been besieged for 18 years that still lives with the vitality and the force, and the hope and the determination of the city of West Berlin";
    d. "When that day finally comes, the people of West Berlin can take sober satisfaction in the fact that they were in the front lines for almost two decades";
    e. "All free men, wherever they may live, are citizens of Berlin".
(23) *family*
    a. "An offense against humanity, separating families, dividing husbands and wives and brothers and sisters, and dividing a people who wish to be joined together";
    b. "Including the right to unite their families and their nation in lasting peace, with good will to all people".

In the same ways as Kennedy's, Reagan's speech embraced both the themes of:

(24) *freedom*
    a. "Because it's our duty to speak, in this place, of freedom";
    b. "Behind me stands a wall that encircles the free sectors of this city";
    c. "It is not the German question that remains open, but the question of freedom for all mankind";
    d. "[They] understood the practical importance of liberty";
    e. "Freedom leads to prosperity. Freedom replaces the ancient hatreds among the nations with comity and peace. Freedom is the victor";
    f. "In Europe, only one nation and those it controls refuse to join the community of freedom".
(25) *Berlin and its citizens*
    a. "President John F. Kennedy visited Berlin";
    b. "Since the two other presidents have come, each in his turn, to Berlin";
    c. "[We're drawn] by the beauty of the Grunewald and the Tiergarden";
    d. "Yet it is here in Berlin where the wall emerges most clearly";
    e. "In West Germany and here in Berlin, there took place an economic miracle";
    f. "From devastation, from utter ruin, you Berliners have, in freedom, rebuilt a city";
    g. "And surely there is no better place than Berlin, the meeting place of the East and West, to make a start";
    h. "So that all the inhabitants of all Berlin can enjoy the benefits that come with life in one of the great cities of the world";
    i. "You Berliners have built a great city".
(26) *human values* as well, such as *courage*
    a. "most of all, by your courage and determination";

  b. "Certainly there's a great deal to be said for your fortitude, for your defiant courage")

(27) *love*
  a. "What keeps you in Berlin is love – love both profound and abiding";
  b. "There in Berlin, like the city itself, symbols of love, symbols of worship, cannot be suppressed"

(28) *hope*
  a. "There is no better way to establish hope for the future than to enlighten young minds";
  b. "And it's my hope that an authority can be found in East Berlin";
  c. "For I find in Berlin a message of hope, even in the shadow of this wall, a message of triumph";
  d. "Today thus represents a moment of hope".

In particular, the themes in common between Kennedy and Reagan's Berlin speeches were analyzed via *Leximancer* and organized in a concept map (Figure 1):

Figure 1 – Main themes in common in Kennedy and Reagan's Berlin speeches. Source: Data processing through Leximancer.

It seems possible to assert something about the most used lexemes by Kennedy and Reagan in the Berlin speeches. As a matter of fact, hereby the most recurring nouns (Table 1 and Table 2), adjectives (Table 3 and Table 4) and verbs (Table 5 and Table 6) are shown. In particular, the presence of such nouns as *Berlin*, *city*, *freedom*, *peace*, *wall*, *West*, *East* and adjectives as *free*, *Western*, *communist*, *Soviet* seem to confirm the importance of the themes emerged in the conceptual map.

Nouns	Frequency
Berlin	10
City	7
Freedom	6
World	6
People	5
Year	5
Man	4
Peace	4
Day	3
Wall	3

Table 1 – Most recurring nouns in Kennedy's speech Source: data processing through *Sketch Engine*.

Adjectives	Frequency
Free	8
Great	4
Many	4
Proud	4
True	3
Good	2
Lasting	2
Communist	2
German	2
Distinguished	2

Table 3 – Most recurring adjectives in Kennedy's speech Source: data processing through *Sketch Engine*.

Verbs	Frequency
Be	34
Have	10
Come	8
Say	6
Let	5
Take	4
Live	4
Join	2
Divide	2
Make	2

Table 5 – Most recurring verbs in Kennedy's speech Source: data processing through *Sketch Engine*.

Nouns	Frequency
Berlin	32
City	22
World	15
West	14
Freedom	13
East	11
Europe	10
Soviets	9
Berliner	8
Wall	7

Table 2 – Most recurring nouns in Reagan's speech. Source: data processing through *Sketch Engine*.

Adjectives	Frequency
Great	8
Free	8
Other	8
Economic	7
Western	7
Good	6
Soviet	5
Human	5
Certain	4
New	4

Table 4 – Most recurring adjectives in Reagan's speech Source: data processing through *Sketch Engine*.

Verbs	Frequency
Be	73
Have	26
Come	10
Do	9
Say	8
See	8
Seek	7
Make	7
Stand	6
Understand	6

Table 6 – Most recurring verbs in Reagan's speech Source: data processing through *Sketch Engine*.

Differently from what was observed about the rhetorical features and seductive strategies of these two speeches, there seems to be no particular difference in the main theme and in the most recurring lexemes in the Berlin Wall speeches by Kennedy and Reagan. As a matter of fact, they both give particular attention to the themes of freedom and of Berlin and its citizens, but they give some space to human values as well. Likewise, the main recurring themes appear to be reflected in the main nouns, adjectives and verbs used by the two presidents.

3. Pragmatic analysis

In this section, following Lombardi Vallauri & Masia (2014), a pragmatic analysis of the use of questionable implicit meanings in the two speeches is proposed. This section is structured as follows: section 3.1 clarifies the bond between implicitating strategies and persuasion, section 3.2 outlines the different implicitating strategies, section 3.3 describes Lombardi Vallauri & Masia's (2014) model, section 3.4 uses Lombardi Vallauri & Masia's method to assess and compare the amount of debatable implicit information in Kennedy and Reagan's speeches.

3.1. Implicit encoding and political discourses

As acknowledged by many scholars (Givón 1982; Rigotti 1988; Sbisà 2007; Lombardi Vallauri 2009, 2016a,b, 2019; Mercier 2009; Reboul 2011; de Saussure 2013; Lombardi Vallauri & Masia 2014, 2016a,b), presenting some content implicitly helps persuade the audience. While explicit assertion is an overt attempt to persuade the addressee of something, implicit communication conveys contents 'under-the-radar' of the addressee, lowering the possibility of arousing critical reactions. Assuming Lombardi Vallauri's framework, implicitating strategies can be divided in two categories, namely those which produce a *content implicitness* and those which produce a *responsibility implicitness* (Lombardi Vallauri 2016a,b, 2019; Lombardi Vallauri & Masia 2016a).

Content implicitness conceals certain notional content, and it is mostly produced by implicatures and vague expressions. Content implicitness makes the addressee reconstruct the part of information that is not given, therefore conveying the feeling that the missing information is something that originates from themselves and not from the speaker. Humans have an unavoidable tendency to consider reliable the beliefs they have reached, an "egocentric bias" which leads us not to critically evaluate the information that comes from ourselves (Reboul 2011; Sperber, Cara & Girotto 1995; Mercier 2009). Consequently, content implicitating strategies are widely used to convey questionable notions, as they reduce the possibility for the addressee to discuss those notions.

Responsibility implicitness conceals the assumption of responsibility for certain content on the part of the source of the message. Its main manifestations are presuppositions and topics. Responsibility implicitating strategies mark the notions they convey as something of which the addressee is already aware and thereby encourage the addressee to pay less attention to those notions. The notions that are already part of our knowledge have, presumably, already been critically evaluated; therefore, re-evaluating them would only mean a loss of time and energy. Hence, people only superficially process these notions (Lombardi Vallauri 2016b, 2019). Since they are marked as part of the addressee's knowledge, the notions conveyed through implicitness of responsibility are "unchallengeable" on the part of the addressee (Givón 1982; see also Macagno 2015), meaning that they will not be reasonably contested. Clearly, it is possible for the addressee not to take for granted some very debatable content; however, questioning implicit information means putting in doubt something that the interlocutor did not assert, that he or she did not present as his or her contribution to the conversation. This is not seen as a good discursive move and therefore is not the preferred strategy (Ducrot 1972; Sbisà 2007; Lombardi Vallauri 2016b).

It is important to note that implicit encoding is not always an attempt to convince the audience of questionable content. Implicit encoding of obvious and/or shared content is just a form of economy of effort (Lombardi Vallauri 2016b, 2019). In (29), for example, if Anne is

already aware that Ben has an uncle, Ben's answer would be quite awkward, and it would be more natural (and efficient) to simply say "I went to the countryside with my uncle" (that is, to presuppose the existence of Ben's uncle).

(29)   Anne: What did you do yesterday?
         Ben: I have an uncle. Yesterday I went to the countryside with him.

3.2. Types of implicitness

For the sake of clarity, in this section, definitions of the main manifestations of the two different types of implicitness are provided. As mentioned above (see section 3.1), implicitness of content is mostly represented by implicatures and vague expressions. *Implicatures* are notions which are not explicitly expressed but inferable from the utterance and the context (Grice 1975). For example, in (30), the implicature makes A conclude that Bill may be visiting Sue, as he has a yellow VW (this example is from Levinson 1983:102).

(30)   A: Where's Bill?
         B: There's a yellow VW outside Sue's house.

When an implicature is not strictly dependent on the specific context in which it appears, as it is activated by almost every context, this kind of implicature is a *generalized implicature* (Levinson 2000). For example, in (31), the generalized implicature conveys the meaning that Emma has no more than three children.

(31)   Emma has three children.

An implicature can also arise from the meaning of a word. In this case, it is named *conventional implicature*, such as in (32), where, by uttering the conjunction "but", it is implicated that beauty and intelligence are in contrast.

(32)   Faith is beautiful but brilliant.

Vague expressions can refer to various entities or states of affairs (Machetti 2006; Lombardi Vallauri 2016a,b, 2019). Stating certain content with a precise assertion makes the truthfulness of that content verifiable. Conversely, a vague expression is too generic to be confuted. For example, in (33), "enjoy" is such a generic label that everybody who reads the sentence will imagine different things.

(33)   Star Voyage: you will enjoy your travel to New York.

Main manifestations of responsibility implicitness are presuppositions and topics. As for *presuppositions*, in Stalnaker's definition, he states "to presuppose something is to take it for granted, or at least to act as if one takes it for granted, as background information – as *common ground* among the participants in the conversation" (Stalnaker 2002:701). Specifically, common ground is made not only by the common beliefs shared between the interlocutors but also by the notions that the interlocutors accept and treat as if they were true for any pragmatic or communicative reason. Presuppositions are triggered by a plurality of linguistic items, such

as definite descriptions (Frege 1982; Russell 1905), factives (Kiparsky & Kiparsky 1971), change of state predicates (Sellars 1954; Karttunen 1973), verbs of judgment (Fillmore 1971), iteratives (Levinson 1983), some adverbial clauses (e.g. temporal clauses, see Lombardi Vallauri 2000, 2009), relative clauses with a definite head (Fox & Thompson 1990; Lombardi Vallauri 2009) (for a comprehensive list of triggers, see Levinson 1983:181-185). An example of a presupposition triggered by a change of state predicate is provided in (34).

(34)   George stopped fishing. (Presupposition: George was fishing.)

Encoding notions by means of a presupposition results in giving those notions a lower informative prominence if compared to the one they would have if they were encoded by means of an assertion (Lombardi Vallauri 2009), and this leads addressees to pay less attention to presupposed notions (Tiemann et al. 2011; Schwarz 2015).

As well as presuppositions, *topics* also present some information as already shared between the interlocutors (Lombardi Vallauri 2016a,b, 2019). However, while presuppositions instruct the addressee to search for some notions in his long-term memory, topics signal that the content they convey is "activated" in the addressee's short-term memory, namely, it is something which the addressee is presently thinking about (Chafe 1987; Lombardi Vallauri 2019). In (35), for example, Isabelle is thinking about the supermarket, as Hillary has just mentioned it.

(35)   Hillary: I will go to the supermarket this afternoon.
(36)   Isabelle: At the supermarket$_{topic}$ you can find excellent apple juice.

Notably, similar to presuppositions, topics can also be used to convey notions which are not really activated in the addressee's short-term memory, resulting in a shallower processing of that information (Lombardi Vallauri 2019, see also Erickson & Mattson 1981; Bredart & Modolo 1988; Sanford 2002; Sanford & Sturt 2002; Sanford & Graesser 2006; Masia 2017). In this case, conveying some notions by means of a topic is a way to signal that those notions are not at issue.

3.3. Global index of implicitness

Lombardi Vallauri & Masia (2014) proposed a system of quantification indexes to measure the intensity and the extent to which presuppositions, topics, vague expressions and implicatures conceal meanings in various texts. The result of this computation is called *global implicitness index*. In the mentioned model, rather than being used for all structures that convey implicit meanings, this system is specifically for the ones that implicitly encode doubtful contents, as an implicit encoding of obvious contents is just a form of economy of effort (Lombardi Vallauri 2019). Using this system, it is possible to quantify to which extent a certain text conveys disputable content in a way that makes it more palatable. Specifically, given a text, for each implicitating strategy conveying doubtful content, the number of characters which the implicitating strategy is composed of is divided by the total number of characters of the text. The result of this computation is then multiplied by an index that is given according to the degree of implicitness of the implicitating strategy, as not all the implicitating strategies have the same degree of implicitness. For example, presuppositions are more implicit than implicatures, as implicature concealment effect is only partial. By the end of the processing of an utterance containing an implicature, the addressee has reconstructed the meaning that was

concealed. On the contrary, when a presupposition is present, the speaker's responsibility is never reestablished. Table 7 shows the indexes that are associated with each kind of implicitating strategies in Lombardi Vallauri & Masia's model.[5]

Implicitating strategy	Index
Presupposition	4
Topic	3
Implicature	3
Vague expression	3
Generalized implicature	2
Conventional implicature	1

Table 7 – Indexes associated with each kind of implicitating strategy.

Finally, the global index of implicitness is computed by summing the values obtained for each implicitating strategy present in the given text.

For the sake of clarity, an example is provided to illustrate how the global index of implicitness is calculated. Suppose that we have to assess the global index of implicitness of the following text, which is an extract from one of the speeches given by Rick Santorum during the 2012 Presidential primary campaign, as analyzed by Lombadi Vallauri & Masia (2014).

(37)   It's getting harder for people to make ends meet, because we have a government **that is crushing us every single day with more taxes, more regulations, and the idea that they know better than you how to run your life [presupposition]**. That ultimately is about what this race is about. It goes down to **the very nature of who we are as Americans [presupposition]**.

This text is composed of 326 characters and contains two presuppositions conveying doubtful notions. The first presupposition is composed of 136 characters, while the second of 43. In order to determine the global index of implicitness, the first step is to divide the number of characters which the presuppositions are composed by the number of characters of the text:

(38)   136/326=0.417 (1st presupposition)
        43/326=0.132 (2nd presupposition)

Then, the results of these computations have to be multiplied by the presupposition index (see Table 7):

(39)   0.417x4=1.668 (1st presupposition)
        0.132x4= 0.528 (2nd presupposition)

Finally, as the two presuppositions are the only implicitating strategies conveying debatable notions that are present in the text, the global index of implicitness is computed by summing the results of the two previous multiplications.

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[5] For the sake of completeness, we have to mention that Lombardi Vallauri & Masia (2014) consider a last type of implicitating strategy, namely *pragmatic presupposition*. However, as this kind of presupposition was not found in Kennedy and Reagan's speeches on the Berlin Wall, it was chosen not to discuss it.

(40)   Global index of implicitness = 1.668 + 0.528 = 2.196

Lombardi Vallauri & Masia (2014) also quantified the global implicitness indexes of two neutral texts, namely those which do not have a strong persuasive aim. These indexes can serve as a reference point to evaluate the amount of implicit information in texts. The first neutral text is an extract from the *Introduction to Cambridge Examination Papers*, and its index is 0.06. The second text originates from a website aiming at promoting tourism in Scotland. Hence, it is expected to make use of implicitating strategies to convey debatable notions. Nevertheless, it is not likely to reach the indexes of the political propaganda, as, being a written text, it can be carefully read, and that can make blatant an excessive use of persuasion strategies. In line with these predictions, the index of the second neutral text is 0.49.

3.4. Comparing the amount of implicit information in Kennedy and Reagan's speeches on the Berlin Wall

In this paper, Lombardi Vallauri & Masia's (2014) model is applied to analyze the amount of implicit information present in Kennedy and Reagan's speeches on the Berlin Wall. The frequency of the different implicitating strategies in the two speeches is also compared.

Figure 2 shows the global index of implicitness of the two presidents' speeches along with the global index of implicitness of the two neutral texts analyzed by Lombardi Vallauri & Masia (2014). Kennedy's index of 1.69 is higher than Reagan's index of 1.10. The indexes of the neutral texts are 0.06 and 0.49, respectively, which makes them appreciably lower than those of both Kennedy and Reagan. Therefore, it is possible to conclude that both Kennedy and Reagan convey a considerable amount of non-objective information using implicitating strategies, and that Kennedy conveys a higher amount of non-objective information using implicitating strategies compared to Reagan.

Global Index of Implicitness
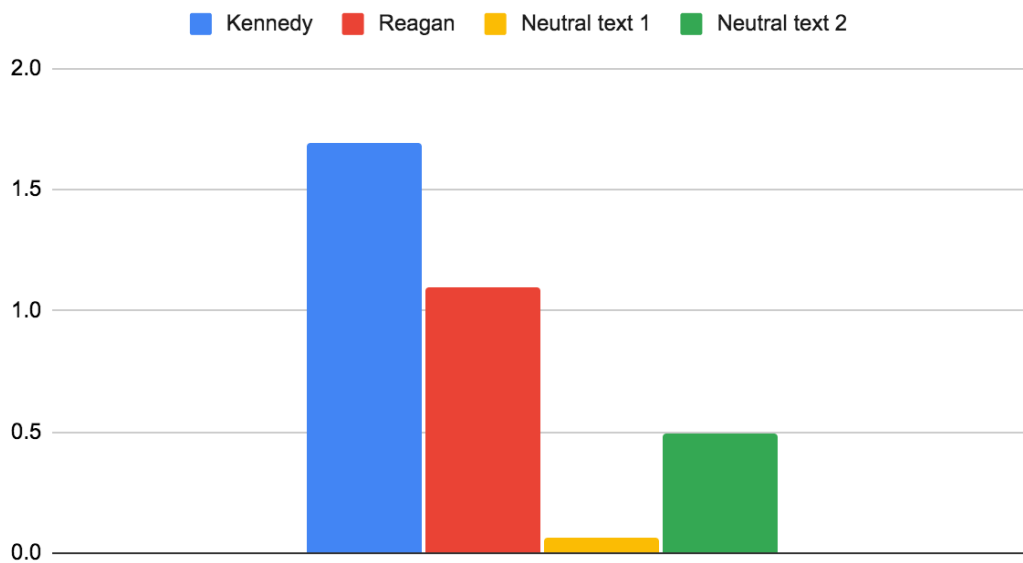
Figure 2 – Global index of implicitness of the two presidents' speeches and of two neutral texts. Neutral text 1 is from the Introduction to Cambridge Examination Papers, while Neutral text 2 is from a website aiming at promoting tourism in Scotland.

Figure 3 illustrates how many times Kennedy and Reagan used the presented implicitating strategies to convey debatable notions in their speeches. Since the two speeches differ greatly in length (Reagan's speech is more than four times longer than Kennedy's), comparing the absolute number of occurrences of these strategies between the two speeches is not applicable. Hence, percentage frequency is used. Namely, the number of occurrences of a certain strategy is divided by the number of occurrences of all the strategies and the result of this computation, returned as a percentage, is compared between the two speeches.

Implicitating strategies
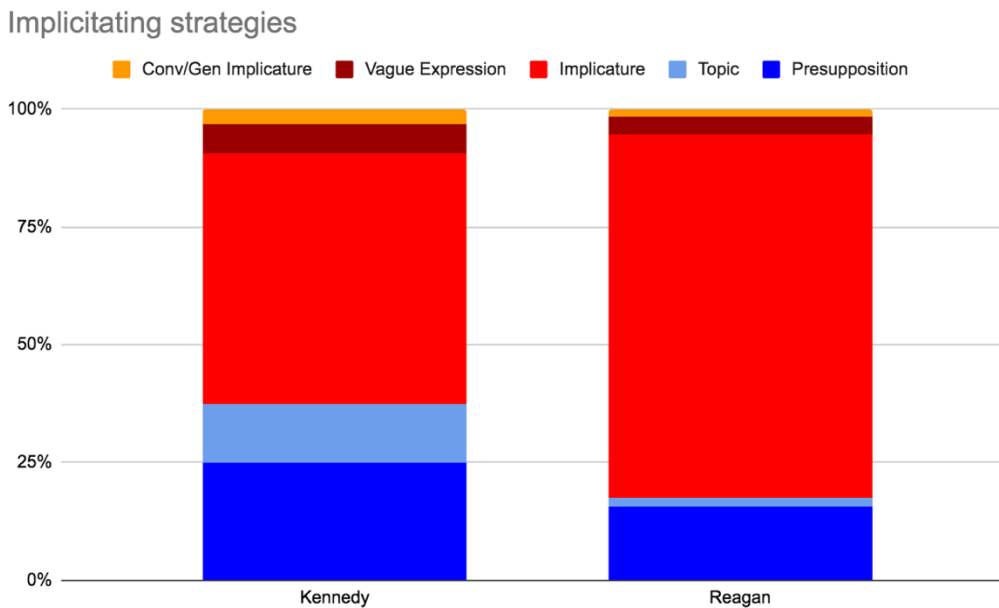
Figure 3 – Frequency of the different implicitating strategies in the two presidents' speeches.

In both speeches, content implicitating strategies represent more than 60% of implicitating strategies conveying questionable information, with implicature being the most used strategy. In Kennedy's speech, implicature represents the 53% of all implicitating strategies conveying debatable notions and in Reagan's speech its percentage frequency is even higher (77%).[6] As for responsibility implicitating strategies, presupposition is visibly more frequently used than topic to convey questionable content. In Kennedy's speech, presupposition percentage frequency is 25%, while topic percentage frequency is 13%. In Regan's this pattern is even more prominent, with presupposition percentage frequency being 16% and topic percentage frequency being 2%.

In Giunta *et al*. (subm.) it is hypothesized that the frequency of content implicitating strategies is higher than that of responsibility implicitating strategies and that the frequency of presuppositions is higher than that of topics only in the case such implicitating strategies convey debatable notions. This hypothesis stems from the fact that the default condition for an utterance is to show a topic-focus articulation, and that presuppositions are also extremely common, as exclusively producing completely assertive constructions makes communication unnatural (Lombardi Vallauri 2009, 2016b, 2019). On the contrary, implicatures do not appear to be so pervasive. Hence, it is plausible that, when conveying shared notions or unquestionable information, content implicitating strategies are not considerably more frequent than responsibility implicitating strategies and presuppositions are not drastically more frequent than topics. In light of this consideration, it is proposed that, in case of implicitating strategies conveying questionable information, the observed frequency patterns can be dependent on the different types of signals that the different strategies give, that is, on the indications they give the addressee on how to treat the information they encode. Content implicitating strategies can be more frequently used than responsibility implicitating ones to convey debatable notions

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[6] Generalized and conventional implicatures are not considered in this computation. If all the different types of implicatures are considered, the percentage is slightly higher, as they represent the 56% of all implicitating strategies conveying debatable notions in Kennedy's speech and the 79% in Reagan's.

because of the fact that the latter signal the content they convey as something that is present in the receiver's memory. Beyond a certain extent, the receiver may realize that that information is not actually part of his knowledge. As for presuppositions and topics, while presuppositions signal the content they convey as part of the long-term memory of the receiver, topics signal it as part of the receiver's short-term memory. As short-term memory and long-term memory differ in capacity, with long-term memory being broader than short-term memory, it could be easier for the receiver to check whether a certain notion is present in his short-term memory than is long-term memory, with the result that presuppositions are more used than topics to convey debatable information.

4. Conclusions

We presented an analysis of Kennedy and Reagan's speeches on the Berlin Wall that we carried out considering two different perspectives. Specifically, our analysis was both semantic and pragmatic in nature. As stated in the first section of this paper, the reason for such a double-perspective analysis is our belief that a complete investigation on meaning should consider these two dimensions, since on one hand semantics studies the meaning of words and their meaning within sentences, whereas pragmatics studies the same words and meaning but with emphasis on their context as well.

As for the content analysis, it finds that Kennedy and Reagan's communicative styles are quite similar, although there are some differences. Kennedy's style is more impersonal, but he manages to communicate with the audience anyway, whilst Reagan's style is more personal – as is evident in the use of quotes, words denoting Action, memorable phrases and the pronoun *I*. Nevertheless, they both resort to anaphoras, bicolons and tricolons, juxtaposition of contrasting contexts, frequent use of the pronoun *we*, formulas in German, direct appeal to the public and reference to far and recent history. However, it is undeniable that both their styles are quite simple and are appealing to the goodwill of people, so that their common aim is to make the speech understandable and create a dialogue with their public. The main themes of their speeches are freedom and the importance of Berlin and its citizens, but they also give some space to human values, such as family, love, and hope as well. Finally, it is interesting to compare the most used lexemes, since they are more or less the same – most of all the nouns and adjectives; the frequency of these words clearly reflects the themes elaborated through the concept map. To conclude, on one hand it is possible to observe that a partial difference between Kennedy and Reagan's speeches lies in the seductive strategies and rhetorical means they used, but on the other the results are really similar and the themes are also aligned.

With respect to the pragmatic analysis, the study focuses on the use of linguistic impliciting strategies to convey debatable notions. Results show that Kennedy and Reagan convey a considerable amount of debatable information using impliciting strategies. In both speeches, content impliciting strategies are the preferred means to convey questionable information, with implicatures being more frequently used than vague expressions. As for responsibility impliciting strategies, presuppositions are more frequently used than topics to convey debatable notions. Following Giunta *et al*. (subm.), it was hypothesized that this state of affairs is only characteristic of the impliciting strategies that convey debatable notions and that the reason for that is to be found in the different types of signals that the different strategies send to the addressee. As responsibility impliciting strategies signal the content they convey as something that is part of the addressee's memory, this may lead to a more sparing use of these resources to convey debatable notions. Specifically, beyond a certain extent, the receiver may

realize that a certain notion is not actually present in his memory and put it under discussion. In parallel, as topic signals the information that it conveys as something that is part of the addressee's short-term memory and presupposition as part of his long-term memory, this may result in a more cautious use of topic compared to presupposition to convey questionable content. Since short-term memory storage capacity is more limited than long-term memory storage capacity, it could be easier for the receiver to check whether a certain notion is present or not in his short-term memory than in his long-term memory.

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Ambiguity and variable phonological rules
The challenge of TD Deletion in US English

Annie Holtz

This study examines how the functionalist approach of ambiguity avoidance, as an explanation for variable application of TD Deletion in US English, can be extended to include effects of homophony avoidance. While previous research has examined the morphological conditioning of this rule across different word classes, the present study focuses on TD Deletion within monomorphemes. Using a small-scale corpus study, I examine how the presence of homophones after truncation influences the rate of TD Deletion for monomorphemes. The results indicate that deletion happens less often when it would have resulted in a form with a high number of homophones.

1. Introduction

Studying the factors that influence application of variable phonological phenomena provides insight into the level of integration that exists between different components of grammar. While phonologists with a classical generative approach to grammar tend to ascribe variability to linguistic performance, rather than forming a part of speakers' linguistic knowledge, variationist approaches to phonological analysis instead argue that the systematicity of variable phonological rules constitute key linguistic knowledge in the minds of speakers (Weinreich et al. 1968). Variationists are interested in the way sounds vary in their phonetic shape and realisation and how these patterns of realisation are driven by contextual factors relating to grammar and social interaction. One key part of language which has been investigated in variationist approaches to phonology is the influence of the content of the lexicon on phonological processes. This influence is perhaps most clear in instances of lexical exceptions to otherwise valid phonological generalisations (Guy 2007), yet with the rise of Exemplar Theory, and associated approaches to grammar, the lexicon has been given a more prominent role in phonology, especially gradient or variable phonological phenomena (Bybee 2000, 2001; Pierrehumbert 2001). These theories posit that the different parts that make up a linguistic system (the lexicon, the phonology, the

syntax etc. Bybee 2006) are highly integrated and thus allow, for example, the lexicon to influence morphological and phonological processes (Wedel 2006). Variationist sociolinguistics takes this one step further and argues that factors which are not, in and of themselves, considered parts of grammatical knowledge can influence phonological processes, such as speaker gender, class and speech context, and that these factors form part of speakers' knowledge about phonological processes, in addition to the precise phonological description of the rules (Weinreich et al. 1968; Labov 1989).

A prominent topic for variationist study of phonological rules is the process of word-final coronal stop deletion in /Ct/ and /Cd/ clusters in English. It forms a prime example of a variable phonological rule as it does not apply consistently when its structural conditions are met, nor are exceptions simply attributable to individual lexical items. Instead, variable application of TD Deletion is conditioned by phonological, phonetic and social factors in systematic ways which hold across many varieties of English (Labov 1969; Guy 1991; Santa Ana 1992; Tagliamonte & Temple 2005; Tamminga 2016; Baranowski & Turton 2020). In its most basic form TD Deletion can be written as follows:

$$(1) \quad \begin{bmatrix} +\text{ coronal} \\ -\text{ continuant} \\ +\text{ obstruent} \end{bmatrix} \rightarrow \emptyset \; / + \text{C\_\#}$$

In US English, this process targets words like *fast* (/fæst/), *bend* (/bɛnd/) and *mint* (/mɪnt/). TD Deletion also applies in derived environments, such as the English regular past tense morpheme *-ed*, which is often pronounced as *-t* or *-d*. For example, it can apply in words such as *walked* (/wɔk-t/), *missed* (/mɪs-t/) or *sinned* (/sɪn-d/). The process of TD Deletion is active in a vast number of different Englishes, including varieties of US English (Labov et al. 1968; Guy 1991), British English (Tagliamonte & Temple 2005; Smith et al. 2009; Baranowski & Turton 2020), Chicano English (Santa Ana 1992) and Jamaican Creole (Patrick 1991) to name a few.

This wealth of research has revealed that several conditioning factors of TD Deletion remain stable across varieties of English. This paper presents a new factor which conditions the application of this rule, namely the functional pressure for homophony avoidance. The present study focuses on the impact of this factor on TD Deletion in the US variety of English spoken around Columbus, Ohio (broadly speaking). However, as the pressure is theorised to emerge due to the general density of homophones in speakers' mental lexicon homophony avoidance, like other factors discussed above, is proposed to also apply in other varieties. Below, I start by giving some background on previously identified factors that condition TD Deletion, with a primary focus on the way in which morphological class membership determines rates of TD Deletion. I finish section 2 by outlining the explanatory role that homophony could play in generating the observed pattern of morphological conditioning, and give examples from previous work on the influence of homophony of phonological processes. Following this, I present the main content of the paper, a corpus study focusing on the role of homophony in determining levels of TD Deletion in the class of monomorphemes in US English. I discuss the results with reference to previous diachronic and experimental work on patterns of neutralisation and homophony, and outline how my results support theories that argue for a high level of integration between the lexicon and the phonological system.

2.   Theoretical background
2.1.   Some conditioning factors

There are several phonology-internal factors which condition the rate at which TD Deletion applies. These include effects of preceding and following segments, such that having certain segments in these positions around the target stop increases (e.g. preceding /s/) or decreases (e.g. following pause) the likelihood of TD Deletion applying (Labov 1989). Explanations for why certain segments are disfavoured in sequence with coronal stops have been based on other, more general, phonological generalisations such as the Obligatory Contour Principle (Guy & Boberg 1997) and the sonority hierarchy (Patrick 1991). Studies focusing on the effects of following segments have revealed that following consonants (e.g. in phrases like *rest stop*) always give rise to higher levels of deletion than a following vowel (e.g. *mist over*) or a following pause (Tamminga 2016; Baranowski & Turton 2020).

Sociolinguistic studies have also identified social factors which influence rates of TD Deletion. More casual speech styles, such as spontaneous speech, give rise to higher levels of TD Deletion compared to speech in more formal contexts or during reading tasks (Cohen & Labov 1967; Wolfram 1969; Tagliamonte & Temple 2005). Similarly, word frequency is another strong predictor for rates of TD Deletion. High frequency words such as *and, just* and *went*, are much more likely to undergo deletion than lower frequency words, such as *accept* (Bybee 2000; Docherty et al. 2006; Guy et al. 2008). Furthermore, high-frequency words cause self-priming effects to emerge for many variable phonological phenomena. This self-priming means that previous realisations of a word tend to prime the realisation of that same word later, so that if a speaker realised *just* without a stop previously, this increases the probability that they will apply deletion again the next time they say *just* (Wedel 2007; Tamminga 2016).

2.2.   Morphological conditioning

Morphological class membership is a predictor of TD Deletion which sits at the interface between phonology and morphology (Labov 1989; Guy 1991). Data from large corpus studies of US English have continuously identified a pattern whereby rates of TD Deletion are higher in monomorphemes (like *waist, bend* and *accept*) than in verbs with the regular past tense morpheme *-ed* (Labov et al. 1968; Neu 1980; Guy 1991; Santa Ana 1992; Fruehwald 2012; Tamminga 2016). Guy (1991) observes this pattern clearly in his data - the final stop was retained 61.9% of the time in monomorphemes and retained 84% of the time in regular past tense verbs. The deletion rule applies at an intermediate rate to semiweak verbs (e.g. *kept*), resulting in hierarchies of the following order:

(2)   monomorphemes > semiweak > regular past tense

TD Deletion is thus most likely to happen in a word like *mist*, less likely to happen in words like *kept* and least likely to happen in words like *worked*. The underlying cause for the intermediate status of semiweak verbs is undecided in the literature. Guy & Boyd (1990) found that this effect was driven by an age effect, whereby adults seem to analyse semiweak verbs as bimorphemic whereas children analyse them as monomorphemic, giving rise to an intermediate level of deletion in studies where results are averaged across these age groups. Other research has argued that speakers have competing morphological analyses for semiweak forms, one with

a final stop (e.g. /wep-t/) and one without a final stop (e.g. /wep/) and that speakers alternate which analysis they use (Fruehwald 2012).

Although this effect has been robust in several varieties of English (Guy 1991; Santa Ana 1996; Guy et al. 2008; Baranowski & Turton 2020) some studies of British Englishes found that this effect could, in part, be explained by differences in phonological environment between monomorphemic and past tense verbs. Studies by Tanner et al. (2017) and Tagliamonte & Temple (2005) observed that there is a general tendency for monomorphemic words to contain more preceding segments that, in and of themselves, promote higher levels of deletion. For example, there are more monomorphemic words that contain a preceding /s/ than there are past tense verbs with a preceding /s/, and having a strident before the target stop is an independent predictor of higher rates of TD Deletion. However, in more recent research that controls for the effects of surrounding segments, the morphological effects holds true even in British English and shows a morphological pattern which is similar to that found in studies of US varieties (Baranowski & Turton 2020).

2.3.   *Explaining the morphological effect*

One of the most influential models that has been used to explain why there are different levels of TD Deletion across morphological classes is the exponential model (Guy 1991). This model was created to extend the Variable Rules framework, developed by Cedergren & Sankoff (1974), Labov et al. (1968) and Sankoff & Labov (1979), by providing some theoretic grounding for why certain conditioning factors within variable rules give rise to the particular distributional patterns we see within a speech community. The formalism of variable rules allows for the weight of several conditioning factors to interact and modulate the probability of a phonological rule applying. Reformulating the rule in (1) using variable rules annotation we would get something like the following (based on Fruehwald forth.:2-3):

(3) $\begin{bmatrix} \text{Cor} \\ \text{- cont} \\ \text{+ obs} \end{bmatrix} \rightarrow (\emptyset) \, / \, \begin{bmatrix} +\text{C} \end{bmatrix}\_\#$

This TD Deletion rule has a base rate probability of applying, represented by φ. Based on the discussion of conditioning factors above, TD Deletion is known to apply more frequently if the preceding segment is a strident fricative, and this can be added to the annotation of the variable rule to create:

(4) $\begin{bmatrix} \text{Cor} \\ \text{- cont} \\ \text{+ obs} \end{bmatrix} \rightarrow (\emptyset) \, / \, \begin{bmatrix} +\text{C} \\ \alpha \text{ strident} \end{bmatrix}\_\#$

Features valued α, β, γ et cetera, modulate the value of φ and thus boost the probability of rule application. Variable rules can also include conditioning factors which are not phonological, such as the speaker's socio-economic class or the speech context (Weinreich et al. 1968). In Labov (1989) these factors include, for example, the grammatical status of the target stop, such that the probability of deletion is higher for stops that are a part of the word stem (i.e. in monomorphemic words) than when they are past tense suffixes. These conditioning factors are associated with weights which combine to create the rule which generates the overall pattern

of probabilistic rule application that we see in a speech community. The precise mechanism by which these weights combine (e.g. in an additive, multiplicative or exponential manner) to generate the final value of φ has been debated in the literature (Labov 1969; Cedergren & Sankoff 1974; Guy 1991). However, key to the motivation behind the exponential model is that, while variable rules allow us to capture descriptive facts about the probability with which variable rules apply, these rules do not tell us *why* a given factor should boost or inhibit the application of a rule at a particular rate. In the case of the morphological patterning of TD Deletion, variable rules cannot tell us *why* TD Deletion applies less often in past tense forms than in monomorphemes. The exponential model thus aims to explain, not just the descriptive differences between rates of application across morphological classes, but *why* it is different across these groups of words.

Guy (1991) bases his analysis on the cyclic mechanisms present in Lexical Phonology, where phonological processes can apply at different stages of a word's morphological derivation (Mohanan 1986; Kiparsky 1982b). Within this framework, the lexicon contains at least two ordered levels where different types of morphological processes apply. For example, under some analyses irregular inflection in English (e.g. lexically specified inflection) occurs at level 1, and regular inflection occurs at level 2. Key to Guy's theory is that the same phonological rules can apply at each level within the derivation of a word. This means that, while the rule itself has a fixed probability of application during each step of the derivational process, the derivational history of a word can influence how many opportunities this rule has to apply before the final surface realisation. This is illustrated in table 1, where TD Deletion can apply at both level 1 and 2 for words like *mist*, since the /t/ is present in the root, whereas it can only apply at level 2 for words like *walked*, since the final stop in this word is suffixed at level 2 in the derivation. This means that the probability of TD applying to a word increases exponentially with the number of levels in the derivation at which it is a valid target for the rule. Thus, the higher rate of deletion in monomorphemic words is caused by those words having multiple exposures to the fixed probability of the TD Deletion rule at each level of derivation. This approach has been successfully applied to data from speakers of several varieties of English (Guy 1991; Santa Ana 1992).

More recent work within the diachronic literature has criticised this approach since it assumes that the rate of application is equal at each derivational level. Research into language change has found evidence that new phonological processes start applying first in the lower derivational levels (e.g. the phrase level) and spread, over time, to apply in more embedded derivational levels (e.g. the word level). Turton (2014) found support for this pattern, that rule application moves up the derivational levels over time, in her research into the distributional history of English [ɫ] and [l]. Furthermore, she found evidence supporting the idea that the rate of rule application is not equal across derivational levels, but rather that rules apply at a higher probability in levels where they have been active for longer. This supports the notion that the probability of rule application in less embedded derivations levels is higher than in more embedded levels since it has been applying at those levels for a longer period of time (Bermudez-Otero & Trousdale 2012). However, TD Deletion has long been considered a form of stable variation (Baranowski & Turton 2020), rather than an instance of change in progress, and so what rate of application one might expect to see at different derivational levels may not be the same for change in progress and variable phenomena that have reached a stable dispersion.

A more functionalist approach to accounting for the morphological conditioning of TD Deletion is that lower deletion rates in regular past tense morpheme is caused by speakers' desire

Environment	Level 1	Level 2	Possible rule application
mist	[mist]	[mist]	✓✓
work-ed	[work]	[work-t]	✓

Table 1: Sample derivation for monomorpheme and regular past tense adapted from Baranowski & Turton (2020:4) and Turton (2016:137).

to preserve grammatical information and limit potential ambiguity in conversation (Kiparsky 1982a). This is illustrated by the examples in (5): if the final stop is deleted in the target word *mist* in (5a) then this does not eliminate any necessary grammatical cues from the utterance, whereas if the final stop in *walked* in (5b) is deleted, the resulting form no longer contains grammatical tense information which could be crucial to the interpretation of the utterance. In (5b), deleting the final stop results in a present tense interpretation of the sentence (*I walk home*). Thus the functional argument of grammatical ambiguity avoidance claims that speakers inhibit application of TD Deletion in past tense forms since the target stop carries important grammatical information.

(5)   Grammatical ambiguity
      a. The *mist* covered the city.
      b. I *walked* home.

2.4.   *Homophony avoidance*

As the above sections outline, the pattern whereby past tense forms undergo deletion at a lower rate than monomorphemic words has been addressed by both formalist and functionalist approaches. While the exponential model provides a neat explanation of how the levels of morphological derivation could influence the application of TD Deletion rules, the diachronic validity of this approach is uncertain and it has failed to capture more recent patterns of TD Deletion (Tagliamonte & Temple 2005; Smith et al. 2009; Fruehwald 2012). The functionalist approach, which explains this pattern in terms of grammatical ambiguity avoidance, requires speakers to exert a significant amount of control over the application of phonological processes by actively inhibiting the rule for forms where deletion neutralises the contrast between past and present tense forms. Yet this explanation focuses only on how TD Deletion gives rise to grammatical ambiguity avoidance and misses out on one crucial point, namely that grammatical ambiguity only arises due to the fact that application of TD Deletion causes homophony between the past tense form of a verb and the present tense form of that same verb. Homophony avoidance has, in and of itself, been investigated as a possible functional pressure in phonology (Crosswhite 1999; Ichimura 2006; Silverman 2010; Kaplan 2011; Kaplan & Muratani 2015; Yin & White 2018) and so it is possible that the pattern of morphological conditioning that we see in TD Deletion is caused by speakers acting in such a way as to limit *both* grammatical ambiguity *and* prevent wide-spread homophony.

   Homophony refers to a situation in which two or more words are pronounced in the same way. Natural languages accept a certain amount of homophony in their lexicon in the sense that there are lexical items with identical phonological forms (e.g. *write* /raɪt/ and *right* /raɪt/ in

US English). Languages can also exhibit instances of derived homophony, as is sometimes the result of flapping in US English where *patting* (/pætɪŋ/) and *padding* (/pædɪŋ/) both surface as [pæɾɪŋ]. In such cases the resulting homophony between *patting* and *padding* is derived by application of the flapping rule. However, there is evidence from both diachronic and experimental sources that speakers tend to behave in ways that minimise the amount of homophony in their language system by inhibiting or fully blocking certain neutralising rules when these increase the levels of homophony in their language (Kiparsky 1982a). This idea originates in a more basic generalisation about language change, namely that neutralising processes are less likely to happen to phonemes that carry a high information load in a language (i.e. distinguish a lot of meaningful contrasts). This approach, dubbed the 'Functional Load Hypothesis' by Jakobson (1931), has been present in linguistic discussion for over a century (Gilliéron 1918). This hypothesis has found support in recent large-scale corpus work which shows that phoneme pairs which have undergone merger distinguish significantly fewer lexical contrasts than unmerged phoneme pairs (Wedel et al. 2013). Similarly, in studies that apply this reasoning directly to how much homophony a given phonological rule creates, Kaplan (2011) and Silverman (2010) found that neutralising rules in Korean create far less homophony than would be expected purely by chance. This suggests that the amount of neutralisation or homophony that a given phonological process generates can influence the direction of language change.

Although these studies have found evidence to support the idea that homophony may play some role in modulating the application and diachrony of phonological processes, traditional generative approaches to grammar struggle to explain such an influence within their theoretical framework. This difficulty mainly stems from the generativist idea of language as a modular construction, whereby aspects of grammar such as syntax, phonology and the lexicon constitute separate systems where each module exerts only limited influence on the workings of another (Pierrehumbert 2001). As such, the phonology has no access to the actual content of the lexicon and cannot be influenced by the presence or absence of homophony. Instead, those studies which are based in a generative framework tend to examine the effects of *possible* homophony, rather than *actual* homophony, on patterns of neutralising rules. Alternatively, they introduce constraints (within the context of Optimality Theory) which allow for some limited influence of homophony but which still do not require access to the content of the full lexicon (Crosswhite 1999; Gessner & Hansson 2004).

An alternative approach, where the lexicon and the phonology are not considered independent systems are those theories which reside within the Exemplar Theoretic framework. Although there are a variety of approaches that fit this label, Kaplan (2017) provides a nice summary of the four main principles that most of these approaches share. First, linguistic knowledge is based on specific remembered linguistic experiences ("exemplars") and our knowledge of, for example a word, consists of a cloud of such exemplars. Second, these exemplars do not merely encode abstract units of linguistic representation, but also include detailed phonetic information and social/context based information about the utterance in which they were heard. Third, storage of exemplars is not restricted to morphemes, or even words, but can include full phrases or utterances. Finally, generalisations about and between units that are stored as a part of our linguistic knowledge emerge as a result of tendencies which exist within the cloud of exemplars associated with specific linguistic units. This view of grammar means that homophony would be represented as overlaps in exemplar clouds encoding pronunciation between different units. This overlap could then lead to issues of lexical access between different forms, and so speakers strive to prevent such overlap from occurring, resulting in behaviour which attempts to limit

ambiguity (Wedel 2006). I return to the implications of observable effects of homophony on our understanding of the split between the phonological system and the lexicon in light of my results in section 5.

While much of the theoretical and historical literature has thus far focused on how neutralising processes and resulting homophony influence diachronic processes, recent experimental work has found that homophony avoidance may also constitute an active synchronic bias in speakers. Most recently, an artificial language learning study by Yin & White (2018) examined whether participants' ability to learn a neutralising rule was affected by the amount of homophony that application of the rule caused within the artificial language. Their results showed that participants either failed to learn, or learned the neutralising rule less well, when it resulted in high levels of homophony. Similarly, in an experimental study with Japanese speakers Ichimura (2006) found that participants failed to apply nasal contraction (/rVn/ → [nn]) to new verbs when doing so would result in homophony with existing Japanese verbs. A more recent investigation of the same phenomena by Kaplan & Muratani (2015) supported the overall conclusion of Ichimura's original study, but found that inhibition of nasal contraction was only probabilistic, rather than categorical.

A further interesting feature of the studies mentioned above is that the competing homophones that give rise to homophony avoidance are distinct lexical items and not paradigmatically related. Previous observations had identified that, as Kiparsky (1982a) noted, neutralisation is particularly unlikely to apply to segments that distinguish key grammatical information, such as tense or number. This observation meant that many researchers argued that pressures from functional load, such as homophony avoidance, only influence phonological processes when these generate homophony within a morphological paradigm (Padgett 2003). This generalisation finds support in work by Crosswhite (1999) and Gessner & Hansson (2004) where phonological rules are either fully blocked or altered when they would cause intra-paradigmatic homophony (see Table 2 for examples).

Interestingly, it is exactly this kind of intra-paradigmatic homophony which emerges in the case of TD Deletion applying to past tense verbs in US English. When the final stop constitutes the full realisation of the English past tense morpheme (e.g. *missed* /mɪs-t/) then applying TD Deletion to such forms (/mɪs-t/ → [mɪs]) invariably results in a form which is homophonous with the present tense version of that same verb (*miss* [mɪs]). Thus, just as in the probabilistic blocking of nasal contraction found in Kaplan & Muratani (2015), homophony between forms caused by the application of TD Deletion could contribute to the pattern of morphologically conditioned TD Deletion by inhibiting deletion for past tense verbs.

Language	Rule	Change	Competitors
Trigrad Bulgarian (Crosswhite 1999)	/ŏ/ → [a]	*blocked*	neut. pl. & neut. sg. masc. anim. acc. & masc. anim. nom.
Russian (Crosswhite 1999)	/ă/ → [i]/Cʲ_	/ă/ → [ə]	3 pl. & 3 sg.
Dakelh (Gessner & Hansson 2004)	/sɬ/ → [s]	/sɬ/ → [ɬʌ]	trans. & intrans.

Table 2: Examples of intra-paradigmatic homophony avoidance, adapted from Kaplan & Muratani (2015:173).

The research on how homophony influences phonological processes tells us three important things. First, the presence of homophony can block or alter otherwise productive phonological rules, especially when the words are paradigmatically related. Second, the presence of homophony can influence the probability with which a rule is applied. Finally, there is some evidence that the density of homophony in a lexicon, even across morphologically unrelated words, can influence phonological processes. This means that, for past tense verbs, the functional pressure to prevent TD Deletion may stem from *both* a pressure to avoid grammatical ambiguity (i.e. the meaning of a sentence becoming present rather than past tense after deletion) *and* to avoid generating more homophonous forms within a speaker's lexicon. Returning to the explanation given by the exponential model it is then possible that, rather than the discrepancy in TD Deletion between regular past tense verbs and monomorphemes being due to cyclic application of the same rule at different stages of derivation, instead the two classes of words may have a different concentration of homophones which influence the application of TD Deletion. Regular past tense verbs invariably have *at least* one homophone, the present tense verb, which may also invoke pressures to reduce grammatical ambiguity, whereas monomorphemes may or may not have homophones and as such homophony avoidance will not apply as readily to prevent TD Deletion applying for this class of words.

Since these two pressures (grammatical ambiguity avoidance and homophony avoidance) could conspire to generate the pattern of rule application in the past tense, a first point of call for evaluating if homophony can play any part in predicting the probability of TD Deletion is to examine a group of words where both pressures do not apply systematically. Thus, in this study, I limit my investigation to monomorphemic words and examine whether the number of homophones that a monomorphemic word has after deletion influences the probability with which TD deletion applies. The prediction is that, due to a pressure for homophony avoidance, if a word has a high number of homophones after deletion, this will reduce the probability of TD Deletion applying to that word. Since previous research suggests that homophony avoidance is especially strong between paradigmatically related words, finding an effect of homophony in monomorphemic words, where competitors are not related, would provide particularly robust evidence for how the content of the lexicon can directly influence phonological processes.

3.   Methods
3.1.   Buckeye corpus

The corpus data in this study comes from the Buckeye Corpus of Conversational Speech, which consists of around 300,000 words of spontaneous speech (Pitt et al. 2007). The corpus is based on recorded interviews of 40 speakers from central Ohio (USA) and data collection was completed around the year 2000. The corpus is stratified for age (under 35 and over 40) and gender of both speaker and interviewer, but does not include any additional demographic information. The phonetic transcription of the interviews that are available with the Buckeye corpus was conducted by a group of students under supervision of the Buckeye corpus team and transcriptions were aligned with the corresponding sound files using the Entropics Aligner. [1]

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[1] Full information on the procedure and methods used to collect and transcribe the Buckeye Corpus can be found in Kiesling et al. (2006).

Category	Contains	Example
and	The word 'and'	*and*
justT	Past tense and participial forms with final [d] → [t] change	*spent*
mono	Words without verbal morphology, and no contractions	*vent*
nochange	No-change past tense forms	*cost*
nt	'Not' contractions	*don't*
past	Regular past tense	*walked*
semiweak	Verbs that have a stem change and add /d/ or /t/	*sold*
stemchange	Verbs that have a stem change, and no apparent affix	*held*
went	The word 'went'	*went*

Table 3: Grammatical encoding for *Gram2* variable

3.2.   Data

The data used in the subsequent analysis was accessed using the *languageVariationAndChange* package in R (Fruehwald 2019). This package was designed to investigate rates of TD Deletion in the Buckeye Corpus and provides data from 38 speakers.[2] The package includes an automatic coding for presence (1) or absence (0) of /t/ and /d/. This coding was generated by comparing the phonetic transcriptions of the Buckeye Corpus data to the canonical transcriptions of each possible target word. The total TD Deletion data (i.e. possible target words for TD Deletion) available through this package is around 30,000 word tokens. The package also includes two levels of coding for grammatical class which are both identical for the class of monomorphemes but differ in their treatment of the semiweak verbs. For the purposes of this analysis the one called *Gram2* is used (see Table 3 for details regarding this grammatical class coding).

3.3.   Data processing

The data was processed using R (R Core Team 2020) and filtered by morphological class to only include monomorphemic target words (*mono* class from *Gram2*). This left 9,846 tokens across 586 unique words for analysis. Note that due to this filtering *and* is excluded as it is known to have incredibly systematic application of TD Deletion due to its high frequency of occurrence. The monomorphemic data frame was then passed through the *phon* package (Mikefc 2018) to access a standardised phonetic transcription of each word in US English as specified by the Carnegie Mellon University (CMU, The Speech Group 2007) pronunciation dictionary. During this process 9 words had no match across the corpus and the pronunciation dictionary and were removed from the data frame (resulting in a loss of 13 tokens). This left 9,833 tokens across 577 words.

The final /t/ or /d/ in these standardised transcriptions were deleted and the resulting truncated forms were compared to the CMU pronunciation dictionary using the *homophone* function in the *phon* package. This comparison generated a count of homophones associated with each

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[2] Note that the original corpus contained 40 speakers, however this package only provides access to data from 38 of those speakers.

word so that, for example, the word *mind* was given a score of one since its truncated form is homophonous with the word *mine*. Similarly *word* received a score of two, since it is homophonous with *we're* and *were* (the CMU includes contractions as lexical items). The same homophone comparison was conducted for the full phonetic transcriptions of each word as well. This was done to confirm the assumption that truncated forms, in general, were more likely to have homophones than the full word. This was confirmed in the data as the truncated forms had a total of 438 homophones, whereas the full forms had 138.

As part of an initial evaluation of words with and without homophones, target words were divided into one of two categories, those that were given a score of zero in the homophony comparison were labelled as *unique* and those with a score of one or above were were labelled as having *homophones*. Table 4 shows counts per word and per token for each of these two categories. Note that although there are more words in the *unique* category, the token counts reveal that these words are, in fact, less frequent than words in the *homophones* category. As this difference in frequency between words with and without homophones could obscure any effect of homophony on levels of TD Deletion a frequency count for each word was calculated so that this could be controlled for in the statistical model. For the purposes of this study the frequency count is based on the absolute frequency of words in the Buckeye Corpus itself. The frequency counts were log transformed to account for the differences in frequencies across words.

Group	*N* **words**	**Tokens**
Homophones	168	6839
Unique	409	2994
Total	577	9833

Table 4: Number of words and tokens per group.

4.   *Results*

The homophony count revealed that truncated forms have a number of homophones in the range 0-9. A first visualisation of the levels of TD Deletion for words with different numbers of homophones post-deletion can be seen in Figure 1. This figure reveals a visual trend whereby an increase in the number of homophones seems to correlate with an increase in levels of retention. By colouring each data point (each word) by its frequency the graph also provides an initial exploration of a possible interaction between number of homophones and frequency. The graph shows no clear indication of an interaction as no pattern of clustering according to frequency is apparent.

A statistical analysis of the visual trend between number of homophones and levels of retention was conducted by fitting a logistic mixed-effects model using the glmer() function in the lme4 package in R (Bates et al. 2015). The model included *retention* as the dependent variable and *number of homophones* and *word frequency* as fixed effects as well as *word* and *speaker* as random intercepts. Including frequency as a fixed effect was motivated by the discrepancies in frequency present in the data presented in Table 3, and to explore the possibility that the effect of number of homophones is different for high-frequency and low-frequency words, the model

also included an interaction between *number of homophones* and *frequency*. The results showed that word frequency is a significant *negative* predictor of levels of retention (β = -0.15, *SE* = 0.04, *z* = -3.90, *p* < 0.001), meaning that words with higher frequency are less likely to retain their final stops. This outcome parallels other research into the effect of frequency on patterns of deletion (Bybee 2000). Conversely, number of homophones is a significant *positive* predictor of retention (β = 0.33, *SE* = 0.10, *z* = 3.43, *p* < 0.001). This means that the higher the number of homophones the truncated form of a word has, the more likely it is to retain the final stop and not undergo TD Deletion. The interaction between *frequency* and *number of homophones* was not significant (β = -0.01, *SE* = 0.02, *z* = -0.32, *p* = 0.75), showing that inhibiting effect of number of homophones on TD Deletion is not modulated by frequency. Full model results are shown in Table 5.
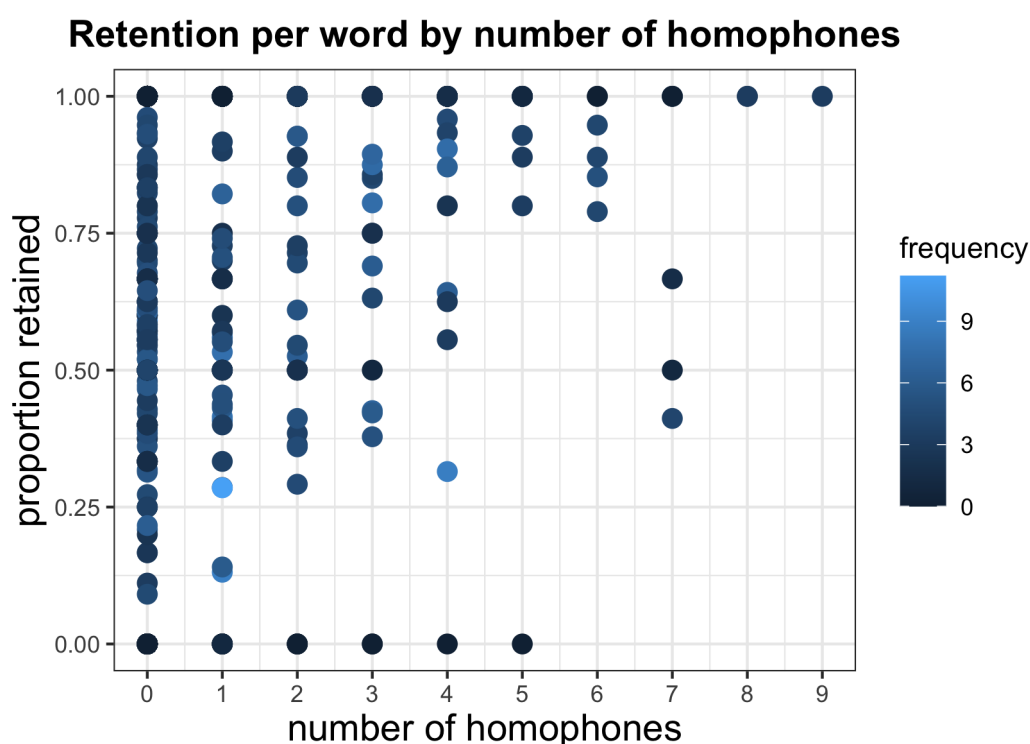
Figure 1: Levels of retention (y-axis) across number of homophones (x-axis) per word, coloured by frequency.

5. Discussion

This corpus study examined whether levels of homophony between truncated words and other lexical items in US English influence the rate at which TD Deletion applies in monomorphemic words. The results indicate that when application of TD Deletion would result in a form with high levels of homophony then deletion is less likely to apply. This effect was gradient such that truncated forms with a greater number of homophones showed higher levels of retention than truncated forms with fewer homophones. Furthermore, the deletion inhibiting effect of homophones was not modulated by word frequency, but remained constant. The lexical items

Model Results

Predictor	Retention			
	Estimate	*Std. Error*	*z value*	*p*
(Intercept)	1.00	0.16	6.31	<**0.001** ***
word frequency	-0.15	0.04	-3.90	<**0.001** ***
N homophones	0.33	0.10	3.43	<**0.001** ***
word frequency:*N* homophones	0.01	0.02	-0.32	0.75
Random Effects	*Variance*	*Std. Dev.*		
Word (Intercept)	0.93	0.96		
Speaker (Intercept)	0.30	0.55		

N Observations: 9833 / *N* Word: 577 / *N* Speaker: 38
*Signif. codes: '***' < 0.001 '**' < 0.01 '*' < 0.05 '.' < 0.1.*

Table 5: Full results for model *retention ~ frequency * homophones* + (1 | Word) + (1 | Speaker).

with which the truncated forms were homophonous were not paradigmatically related to the original word, as is the case when deletion targets the past tense morpheme in regular past tense verbs, but rather make up the general density of homophones across speakers' lexicon. This section discusses these results in relation to previous work on homophony avoidance and outlines how the results align with theoretical statements regarding the integration between phonology and the lexicon. Finally, it highlights further directions for research into the effect of homophony on variable rules and other linguistic phenomena.

While some approaches which aim to explain varying levels of TD Deletion appeal to more theoretical abstractions, such as the division of the lexicon and cyclic rule application (as employed in the exponential model described in section 2.3.) the results of this study instead suggest that functional pressures relating to neutralisation and homophony avoidance can have direct influence on the application of variable phonological rules. Previous work in diachronic phonology shows that functional considerations, such as the number of meaningful contrasts that phonemes distinguish, influence the likelihood of phonemes undergoing neutralisation (Wedel 2006). These studies have found evidence that phonemes that carry a high information load are less likely to neutralise over time, and that this is especially true if the phonemic contrast is key to distinguishing important grammatical cues, such as case and tense (Kiparsky 1982a). Similarly, work focusing on derived homophony has found that potential homophony between words in the same morphological paradigm can give rise to categorical blocking or changes to otherwise productive phonological processes in speakers' grammars to avoid generating intra-paradigmatic homophony (Crosswhite 1999; Gessner & Hansson 2004). Including effects of homophony avoidance in grammatical descriptions poses certain problems for generativist theories since these approaches have, traditionally, held a very modular idea of grammar where the lexicon has little ability to influence phonology (Pierrehumbert 2001).

There have been some attempts to include mechanisms in generative grammar which explain restrictions on neutralisation processes; these have mostly focused on neutralisation avoidance at the level of *possible* words, rather than the words that are actually in the lexicon. This is in line

with the traditional goal of generativist phonology, which is to describe the possible words in a language and not just the words that are in the lexicon (e.g Halle 1962), but also limits neutralisation avoidance to only be active on a phonemic level such that it can prevent certain phonemic mergers from happening, but does not allow for any direct influence of lexical homophony on phonology. While some additions have been made to frameworks such as Optimality Theory to account for effects of homophony, these have limited the influence of homophony to be intra-paradigmatic. For example, Crosswhite (1999) proposed a version of Optimality Theory which includes a constraint called ANTI-IDENT, which compares outputs derived from the same stem and is violated if the outputs are identical. It can thus model the influence of intra-paradigmatic homophony avoidance but, crucially, necessitates that phonological processes are not influenced by homophony between unrelated words.

These theories would predict that homophony avoidance should have an effect within the class of past tense verbs, since their competing homophone (the present tense version of the same word) is paradigmatically related to the past tense form. The results of this paper, that homophony avoidance seems to have an effect even across morphologically unrelated words, are unexpected under such accounts and suggest a much higher level of integration between phonology and the content of the lexicon. Instead, the results find a natural explanation within the framework of Exemplar Theory, where the lexicon plays a crucial role in both phonological and morphological processes (Pierrehumbert 2001).

In exemplar theoretic approaches to phonology speakers store detailed memories of words and utterances in complex networks where the production, perception and storage of these items give rise to phonological generalisations (Wedel 2006; Kaplan & Muratani 2015). The pressure to maintain meaningful contrasts between these stored elements is crucial for communication and studies have found that storing ambiguous forms (like lexical neighbours and derived homophones) is particularly hard and leads to a feedback loop between production and perception which can cause distinct categories to drift apart in phonological space to preserve contrasts (Wedel 2004, 2006). Similarly, this difficulty in storing ambiguous forms and the feedback loop created to preserve contrast could influence TD Deletion such that it limits the availability of the truncated variant of a word if it occupies a much denser neighbourhood in the lexicon due to it having many homophones (Kaplan & Muratani 2015). Building a model of exemplar theory which can account for the kind of probabilistic effect of homophony avoidance on variable phenomena, like we see in this paper and in Kaplan & Muratani (2015), represents an interesting direction for future research. Such an effort would also need to account for the difference between intra-paradigmatic and inter-paradigmatic homophony avoidance, whereby in the first instance we seem to get full blocking of phonological rules but only probabilistic avoidance in the second.

In general, further research into the effect of homophony avoidance on the application of variable phonological rules would constitute valuable evidence for the integration between the phonological system and the content of the lexicon. This study contributes to this area of enquiry but future studies should extend to cover other variable phonological rules, possibly comparing those that represent ongoing change and those that constitute stable variation. Such studies would benefit from using a more closely matched source corpus and pronunciation dictionary, as the CMU dictionary used in this study was compiled nearly a decade after the interviews in the Buckeye Corpus and is not specifically tailored for the variety of US English spoken around Columbus, Ohio.

Similarly, there is some disagreement in the literature regarding what measure should be

used to capture frequency effects in phonetic and phonological phenomena. While some studies use standardised measures from large-scale corpora such as Brown Corpus of Standard North American English (Dinkin 2008), others argue for the use of speaker tailored corpora to give a more accurate estimate of frequency effects. For example, Brysbaert & New (2009) found that a corpus based on television subtitles constituted a better match for frequency effects in studies where participants were undergraduate students, than a corpus based on newspapers and books. In this study I measured frequency based on counts from within the Buckeye corpus itself. This was motivated by findings in previous studies which show that speakers tend to self-prime deletion and thus capturing which words occur often within varieties that match the speakers' own was key to this particular phenomenon (Poplack 1980; Tamminga 2016). Future studies might consider using an alternative strategy for compiling a frequency count which aligns with the specific phenomenon and speech community.

As regular past tense forms undergoing deletion will invariably have at least one homophone (the present tense version of the word) homophony avoidance may thus contribute to the lower levels of TD Deletion in past tense forms. The probability of deletion causing grammatical ambiguity is much higher for past tense words than for monomorphemes and so investigating the effect of homophones on the monomorphemic words allowed me to disambiguate the effects of homophony avoidance and grammatical ambiguity avoidance. Furthermore, since previous research looking at categorical phonological phenomena has found evidence that intra-paradigm homophony can cause full blocking of phonological alternations it is possible that the influence of homophonoy avoidance is a much stronger pressure in such cases, contributing to the lower levels of deletion we see in past tense forms across many varieties of English. Extending the analysis in this paper to look at homophony within the class of past tense verbs would be an interesting next step. For example, in phrases that contain temporal markers of past tense, such as *I walked to work yesterday*, the word *yesterday* means that, even if the verb is pronounced without the final stop, the resulting sentence does not exhibit grammatical ambiguity. Comparing deletion in past tense forms in such instances to past tense verbs without disambiguating context might allow for an evaluation of how the pressure for homophony avoidance influences TD Deletion for past tense verbs without the compounding pressure to avoid grammatical ambiguity.

6.   Conclusion

The results of this study align with research which shows that homophony avoidance can apply between words which are not paradigmatically related and that the inhibiting effect of homophony can be probabilistic, rather than categorical (Kaplan & Muratani 2015; Yin & White 2018). As previous research has shown that paradigmatically related words can cause full blocking of phonological neutralisation rules it is possible that the influence of homophony avoidance is stronger in past tense forms where the homophones are paradigmatically related, thus helping to account for the morphologically conditioned effects that many studies have observed when examining TD Deletion. These results suggest that the content of the lexicon can have real, systematic, effects on application of phonological processes, thus supporting theories of grammar where lexical and phonological information are deeply integrated.

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You shall know a tag by the context it occurs in

An analysis of German tag questions and their responses in spontaneous conversations

Yulia Clausen

This study explores the contexts of occurrence of German sentence-final question tags *ja*, *ne*, *nicht*, *gell* and *oder* in a corpus of spontaneous conversations. In German, these tags can be used interchangeably for the most part, yet there do exist cases where certain tags are less felicitous or even unacceptable. I propose an analysis of these tags as common ground management devices and demonstrate the relevance of their contexts and responses they occur with for determining their felicity conditions and discourse functions.

1. Introduction

German particles, such as *ja*, *ne*, *nicht*, *gell* and *oder*, often appear in a sentence-final position where they can function as (question) tags.[1] A tag attaches to the *anchor* sentence expressing a proposition, together with which it constitutes a tag question (TQ). Tag questions can be seen as 'intermediate constructions' between statements and questions (cf. Allerton 2009:316) and are typically used to express assumptions or opinions while also 'aim[ing] at eliciting a response, however minimal, from the addressee' (Holmes 1982:44).

Tag questions can be divided into two broad classes, according to whether they request or share information (cf. e.g. Heim 2019 for German *gell*; Tottie & Hoffmann 2006, Kimps et al. 2014, Wiltschko et al. 2018 for English). These classes are associated with different levels of speaker commitment (or certainty) towards the expressed proposition (cf. e.g. Andersen 1998:1). The ones requesting information (cf. *confirmationals* in Wiltschko et al. 2018:571) represent a typical use of tag questions in many languages, including German. They signal a weakened speaker commitment towards the proposition. For example, in (1), the German tag *oder* is used to ask for confirmation of an assumption. Similarly, the English tags *right* and *isn't it* can fulfil this function.

(1)   [A group of friends is out having a picnic. Suddenly one of them remembers that their mutual friend, who is currently abroad, must have a birthday sometime soon and wants to confirm it with the others.]
    Annes Geburtstag ist nächste Woche, oder?
    'Anne's birthday is next week, right/isn't it?'

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[1] These particles can also function as tags in sentence-internal and sentence-initial positions, which I do not consider here. Also, some of these particles, e.g. *ja*, can have other functions in the sentence-final position.

In German, tag questions are also extensively used to provide information to the addressee.[2] For example, the tag question in (2) is used to inform a new neighbour about the house rules and, by means of the tag *gell*, elicit feedback to confirm that this information has been successfully perceived by the addressee. These TQs involve a strong speaker commitment to the proposition.

(2) [Max moves into a new home. He struggles to understand the housekeeping rules. On the next cleaning day, another tenant reminds him of his responsibilities.]
    Am Samstag wird hier die Kehrwoche gemacht, gell!
    'On Saturdays, we do the cleaning here, gell!'

(adapted from Heim 2019:133)

As Clausen & Scheffler (2020b) discussed in their corpus study, tags in German are interchangeable to a large extent, but are also subject to constraints. For instance, in (1) we could easily replace *oder* with *ja*, *ne*, *nicht* or *gell* and arrive at the same interpretation. Example (2), however, is not that straightforward – here, it is possible to use *ja*, *ne* and *nicht*, but *oder* would be infelicitous. Since *oder* is mostly associated with speaker uncertainty (cf. Clausen & Scheffler 2020b), it requires a context where the speaker asks for confirmation. Hence, *oder* becomes felicitous if we change the context in (2) to that of (3). Interestingly, the tags *ja*, *ne*, *nicht* and *gell* can be regarded as ambiguous between these two interpretations, as they work well in both types of contexts (cf. (2) and (3)).

(3) [Max moves into a new home. He struggles to understand the housekeeping rules. On the next cleaning day, he asks another tenant about his responsibilities.]
    Am Samstag wird hier die Kehrwoche gemacht, oder?
    'On Saturdays, we do the cleaning here, oder?'

(adapted from Heim 2019:133)

Furthermore, Clausen & Scheffler (2020b) found that *ja* is virtually the only tag that combines with commands/requests. In (4), a Twitter user posts a tweet with a request to be informed when a particular event is finished. Whereas it might be possible to use *gell* or *ne* instead of *ja* in this tag question, *nicht* and *oder* would be infelicitous.[3] To make, for example, *oder* felicitous in this context would at least require assuming speaker uncertainty regarding the proposition.

(4) Ach, schon wieder. Melde dich, wenn's vorbei ist, ja/?gell/?ne/*nicht/*oder?
    'Ah, yet again. Let me know when it's over, ja/?gell/?ne/*nicht/*oder?'

(adapted from Clausen & Scheffler 2020b:17)

These examples demonstrate the importance, if not the necessity, of including the discourse context in the process of tag question interpretation. Considering a tag question in isolation or in the small context of, say, one additional sentence is not sufficient in the vast majority of cases. A larger context provides insight into the discourse setting, the interlocutors' authority, their possible (mutual) beliefs and other information that potentially constrain the use of particular tags.

In this paper, I build upon the corpus-based study of German tag questions by Clausen & Scheffler (2020b) and provide a more in-depth analysis of the felicity conditions of the five tags

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[2] I use the term 'information' in a broad sense to cover anything that the speaker shares with the addressee that the addressee (presumably) does not know, i.e. not only purely factual statements, but also opinions, wishes etc.

[3] These judgements are based on native speakers' intuitions. See also the results of the judgment-elicitation experiment in Clausen & Scheffler (2020a).

examined in their study – *ja*, *ne*, *nicht*, *gell* and *oder* – on a subset of their data. First, I look into the preceding discourse context of the TQs, which includes several turns uttered by the interlocutors prior to the turn containing the TQ.[4] This allows me to determine whether the TQ falls into the information-providing or information-requesting class, as well as its more specific discourse function (see Section 5). Second, I analyze the kinds of responses TQs receive in the corpus data. Whereas the analysis of prior context facilitates the interpretation of speaker's intentions, responses provide an insight into the perception of TQs by the addressee, e.g. how they are being interpreted and whether the given response type goes in line with the speaker's intentions. Together, the preceding context and responses can be used to explain the felicity conditions of the considered tags and cases of their (non-)interchangeability.

The rest of this paper is structured as follows. Section 2 provides an overview of the previous research on the discourse functions of tags, and summarizes the study by Clausen & Scheffler (2020b) that I build upon. Section 3 describes the data used in the present study, and Section 4 introduces the proposed typology of tag question responses. The analysis of tags' functions is presented in Section 5, which is followed by a discussion and conclusion in Section 6.

2.   *Previous research*
2.1.   *Functional classifications of tags*

Functional classifications of tagged utterances have been proposed for various languages (for an overview, see e.g. Tomaselli & Gatt 2015; Clausen & Scheffler 2020b). Many of these studies consider the TQ as the unit of analysis, i.e. the anchor and tag together are ascribed a certain discourse function (e.g. Gold & Tremblay 2006; Axelsson 2011; Kimps et al. 2014; Gómez González 2014, 2018; Barron et al. 2015; Tomaselli & Gatt 2015). These TQ functions, however, oftentimes are merely 'the function[s] of the specific context[s] in which [the tag] is embedded' (Wiltschko et al. 2018:575), such as making a request or expressing an opinion. This does not necessarily explain the speaker's use of a tag, and as Holmes notes, '[i]t is important in analysing tag questions to avoid confusing the function of the tag with the function of the speech act in which the tag occurs' (1984:358). For example, a tag following an interrogative anchor (e.g. *Hat er es irgendwie falsch frankiert oder?* 'Did he stamp it wrong somehow TAG?') is not what makes the utterance a question.[5] Similarly, an imperative anchor expresses a command independently of the tag attached to it (e.g. *Melde dich, wenn's vorbei ist, ja?* 'Let me know when it's over, TAG?'). Hence, '[d]istinguishing the illocutionary force of the utterance as a whole from that of the untagged utterance is a necessary step in clarifying the effect of the [tag]' (Holmes 1982:47). Nonetheless, fewer studies have attempted to define the functions of a tag itself; studies on different varieties of English as well as on German are summarized below.

Holmes (1982, 1984, 1995) views tags as illocutionary force modifiers that attenuate or boost the strength of positive and negative speech acts. She distinguishes two types of tags based on whether they convey the speaker's attitude towards the content of the expressed proposition or towards the addressee in the context of the utterance. In Holmes's (1995) classification of New Zealand English tags in spoken corpus data, the former are *epistemic modal* tags that signal

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[4] The number of turns is not predefined. I examine as many turns prior to the TQ as necessary for the analysis of each individual case.

[5] This example is taken from the CallHome corpus, file ge_5421.

uncertainty or unwillingness to take responsibility for the validity of the proposition.[6] The latter are *affective* tags used when the speaker has no or only minor doubts regarding the content of the proposition; they have interactional meaning and include three subtypes: attenuating negatively connotated speech acts, forcing feedback, and inviting the addressee to contribute to the discourse. Holmes emphasizes that tags are multifunctional and can 'simultaneously express speaker uncertainty, appeal [...] for reassurance [and] elicit a response [...]' (1982:45), and proposes that in each specific context one of the functions predominates.

Another classification for English tags based on corpus and other types of data was proposed by Algeo (1988, 1990, 2006). He distinguishes between *informational* (genuine requests for information; speaker expects either a positive or a negative response), *conversational/confirmatory* (used to ask for and expect to get confirmation of the preceding statement), *punctuational* (used primarily in monologues for emphasis without en-/discouraging a reply; addressee should merely pay attention to what is being said), *peremptory* (used to close off a discussion and discourage the addressee), and *aggressive/antagonistic* (follow statements whose truth the addressee cannot know) tags.

These classifications have served as a basis for many subsequent corpus studies. The following two approaches bring to the fore the combinatory effect of tags' subjective and interactive properties. Andersen (2001) follows Holmes in assuming two broad functional aspects of the tag *innit* based on the speaker's certainty in the expressed proposition: *attitudinal* and *interactional*. He proposes functions that combine subjective and interactional properties of the utterance (2001:118-120): the speaker's certainty, the speaker's evaluation of the addressee's relation to the propositional meaning of the utterance, and the expected addressee's involvement (provide confirmation, or be reminded or convinced of the proposition). Some of the described functions, however, refer to the whole utterance rather than the tag itself (e.g. to remind the addressee of the proposition in *Remember I'm walking with Ritchie and Andrew innit?*; cf. Andersen 2001:119).

Mithun (2012) examined Mohawk tags within full syntactic and discourse contexts and identified six conversational functions, half of which correspond to those of Holmes and Algeo. The functions are placed on a continuum between purely epistemic and interactive, allowing the speakers to bring any of them to the foreground as needed. In addition to the conversational functions, Mithun (2012) determined five functions of tags in narratives. For each tag type, she documented whether and what type of response it typically solicits.

A more unified characteristic of tag functions was proposed by Allerton (2009), who treats tags as 'feedback requests' (2009:313). He distinguishes three pragmatic functions for English tags according to the type of invited feedback: understanding/listening of the message expressed in the anchor, agreement with the truth/correctness of the propositional content, and agreement with the expressed plans/arrangements/orders. Allerton emphasizes that certain tag forms (e.g. *right*, *yeah*) are ambiguous and can have multiple interpretations in the context of one TQ (cf. 2009:313f.). For example, in *We're leaving at seven fifteen, right?*, the tag *right* can be interpreted as either 'is this correct?' or 'do you agree?'. This shows that a larger context and responses are important for disambiguation. The author does not perform an analysis of responses, though.

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[6] Although associated with uncertainty, these tags do not necessarily aim at eliciting confirmation from the addressee, as the following example from (Holmes 1982:52) shows:

(i)   Speaker to the listener who had met her only recently: *I sat the exam in sixty three was it.*

A clear account of separating the tag function from that of the utterance it attaches to is provided by Wiltschko et al. (2018), who analyze the Canadian English tag *eh* based on native speaker judgements and corpus data. They show that discourse functions of a tag do not equal its context of occurrence, and identify the principal, i.e. context-independent, function of *eh* as '(I believe) you agree with this speech act' (2018:578). Its contextually derived functions are determined (among other factors) by the clause/speech act type of the anchor and the discourse context it occurs in. The context helps to correctly interpret a TQ. For example, an assertion modified by *eh* is interpreted as a request for confirmation, but, depending on the interlocutors' authority/knowledge, three different functions can arise. In the case of speaker authority, *eh* functions as a check for whether the addressee understands or knows about the proposition. If the addressee has the authority, *eh* is used to confirm the truth of the proposition. In the case of equal authority, e.g. when expressing a subjective judgement, *eh* is used to confirm the addressee's agreement with the proposition. Wiltschko et al. (2018) discuss responses to a certain extent to support their analysis.

Functional approaches to German TQs clearly differentiate between the meaning of the whole utterance and the contribution of the tag. However, so far, only several individual tags have been analyzed for their discourse functions (but see Clausen & Scheffler 2020b). Hagemann (2009) distinguishes tags that elicit responses (turn-final) from those that interact with common ground knowledge of the conversation participants (turn-internal). According to Heim (2019), *gell* can request confirmation of the truth of the proposition or of the speaker's authority depending on the speaker's epistemic status. Similarly, *ne* is used either to elicit a confirmational response or to check for continuing attention and understanding (cf. König 2017). In Drake's (2016) analysis of the tag *oder* in spontaneous speech, she considers the type of responses *oder*-TQs receive. She finds that '[w]hen participants use *oder* [...], they formulate an understanding and offer it for dis/confirmation to the co-participant' (2016:174) or 'make relevant an alternative to the one contained in the *oder*-turn' (2016:179). She notes that those instances of *oder* that ask for an alternative can also receive a (dis-)confirmation as a marked response (cf. 2016:180,188).

Although most of the described studies have considered responses as part of tags' context, no comprehensive analysis thereof has been performed. Andersen (1998) empirically tests the response-elicitation effect of tags in spoken English corpora and discusses possible response types. One of his main findings is that a large number of tags (predominantly in narrations) do not elicit responses. Some of the studies that focused on TQs as a whole have considered responses more fully and proposed different (partly overlapping) response type classifications. Kimps et al. (2014) provides a quantitative analysis of response types for each identified TQ type. Gómez González (2018) lists potential response types associated with different TQ uses and provides a quantitative overview of obtained responses.

2.2.   *Clausen and Scheffler (2020)*

Clausen & Scheffler (2020b) studied German TQs in three types of corpora: spontaneous telephone conversations between family members and friends (CallHome, Karins et al. 1997), in-person dialogs between strangers (GECO, Schweitzer & Lewandowski 2013), and a German Twitter corpus (Scheffler 2014). They explored the overlap and differences in the use of the five most common tags in their data – *ja*, *ne*, *nicht*, *gell* and *oder* – based on the clause type

and speech act of the anchor, speaker certainty in the expressed proposition and the type of requested confirmation from the addressee.

They found declarative assertions to be the most common anchor type for all tags. Two tags showed clear specialization: *ja* for imperative directives and *oder* for interrogatives. The speaker was considered certain when expressing an opinion or knowledge, and uncertain in all other cases, especially when asking for confirmation. As can be inferred from this definition, TQs in which the speaker is certain belong to the information-sharing class, whereas the ones that reflect uncertainty are information-requesting. Clausen & Scheffler (2020b) found that although certain tags have preferences, in general, all of them can appear with both classes. They reported the following individual tag preferences: *ne* and *nicht* favor contexts of certainty, whereas *oder* has a strong bias for uncertainty. By contrast, the preferences of *ja* and *gell* seem to depend on other factors, such as the type of conversation.

Clausen & Scheffler (2020b) defined four types of confirmation requests: confirm the truth of the proposition, show agreement with the proposition, confirm that you heard what was said, and accept the expressed command. For confirmation of the proposition's truth, *oder* and *ne* were used the most, *gell* to a lesser extent, and *ja* and *nicht* only in telephone conversations. For eliciting agreement with the proposition, *ne* and *oder* were the most commonly used tags as well, whereas other tags were (much) less frequent. In contexts where the speaker was checking the addressee's involvement, *ja* and *ne* were the common choice, *nicht* and *gell* were used less, and *oder* almost never. To elicit acceptance of the expressed command, speakers used *ja* and occasionally *gell*. The overall results showed that tags overlap to a great extent across all explored categories, which presumes that they share discourse functions and explains their mutual interchangeability. The results further revealed certain tags' preferences/constraints for particular contexts, but did not clarify how exactly these come about.

The annotation was performed based on tag questions either isolated from their context or accompanied by a fairly small context of several additional sentences.[7] The judgements were based on intuitions of a native speaker with a linguistics background. However, not taking into account the larger context may potentially be problematic for this kind of annotation, since, as illustrated in Section 1, context is a means to disambiguate the class of a TQ (cf. (1) and (2)), and it provides further relevant information regarding a tag's function. The fact that tags display a great overlap across the annotated categories shows that more contextual knowledge about the tagged utterance is needed to uncover the finer-grained differences in the usage of individual tags. Thus, in many cases a TQ alone might simply be insufficient to correctly judge the speaker's intention. Another potential difficulty with Clausen & Scheffler's (2020b) annotation is that the annotator might have been biased by the tag itself. For instance, *oder* is usually used in the contexts of uncertainty which is why the probability of annotating a TQ as *uncertain* could be higher for such cases. And although the annotation results are mixed, also for the certainty category for *oder*, the bias cannot be completely excluded. A thorough examination of a larger context window, i.e. beyond the TQ itself, would help to increase accuracy by narrowing down potential interpretations.

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[7] For instance, in the CallHome corpus data, TQs are embedded in turns that often consist of several sentences (see (5) in Section 3). Clausen & Scheffler (2020b:10) define a turn as a speaker's contribution to the dialog, whose boundaries are marked by a speaker change.

3.   *Data preparation*

In this study, I focus on the CallHome part of the TQ dataset from Clausen & Scheffler (2020b).[8] This dataset consists of conversational turns that contain TQs with the sentence-final tags *ja*, *ne*, *nicht*, *gell* and *oder* in the turn-medial and turn-final positions. An example of a turn from this dataset is given in (5). This turn was extracted from the file *ge_6144* in the CallHome corpus; it starts with the timestamps that mark its beginning and end, and is uttered by the speaker A. It contains a TQ with the sentence-final tag *gell* in the turn-medial position.

(5)   425.16 434.87 A: Ja, ja. Das stimmt auch. Das ist nicht übertrieben, **gell**. Das, das ist genauso. Ich meine, das wird sowieso ein bißchen primitiv sein, aber das Haus ist toll.
         '425.16 434.87 A: Yes, yes. And that's true. That is not exaggerated, **gell**. This, this is exactly the same. I mean, this is going to be a little primitive anyway, but the house is great.'   (ge_6144)

Many turns in the dataset contain more than one TQ, in which case I follow the procedure in Clausen & Scheffler (2020b) and analyze each TQ separately.[9] To access the tags' contexts, I located each TQ from Clausen & Scheffler's (2020b) dataset in the original CallHome data files. In the process of context examination, which is described in the following section, I reconsidered some of Clausen & Scheffler's (2020b) annotations as to which utterance constitutes a TQ and which does not.[10] I added 18 turns with *ja*- and 4 turns with *nicht*-TQs, and removed about the same number of turns. Furthermore, I manually augmented their dataset with turns ending with an exclamation mark (15 *ja*, 8 *ne*, 2 *gell*), as I noticed instances of such TQs during the examination of the CallHome data.[11] To resolve difficult cases, I listened to the pronunciation of the utterances in question in the CallHome recordings,[12] which led to the exclusion of 15 TQs with *ja* and one with *oder*. In five cases, a tagged utterance ended with two consecutive tags. There might be different reasons for speakers to use two final tags in a TQ. For instance, in (6), the speaker might have become less certain while uttering the TQ and used *oder* as a correction of *ne* to signal uncertainty. Alternatively, a speaker might have used it as a prompt if no immediate response came from the addressee. As it is not clear what motivates the use of each of these two tags and how they influence the addressee's response, I exclude these cases from the analysis and leave them for future work. This, however, does not apply in cases where the same tag is used twice at the end of a TQ.

(6)   A: Und jetzt wo, na ja, und jetzt, wo dann der Papa nicht mehr Führer ist vom Kolonnenamt, das hilft dann auch, **ne**, **oder**?
         'A: And now when, well, and now, when dad is no longer the leader of the column office, that helps too, **ne**, **oder**?'   (ge_6350)

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[8] I opted for the CallHome corpus, as it contains the most TQs (and responses), and its format is particularly suitable for manual examination.

[9] For the annotation, which was performed manually in an Excel file, each turn with multiple TQs was duplicated as often as the number of TQs contained in the respective turn; these multiple turns are included in the reported counts.

[10] The authors automatically extracted TQ candidates from the corpora, and manually disambiguated them as containing a tag or not. They did not consult the context in the corpus data, but performed the disambiguation based on the contents of the extracted turns.

[11] Clausen & Scheffler (2020b) extracted turns ending with a period or a question mark, as well as combinations of exclamation and question marks. I refer the reader to the original paper for details.

[12] Recordings of the CallHome transcriptions can be found on TalkBank: `https://sla.talkbank.org/TBB/ca/CallHome/deu` (last accessed on 22.09.2021).

To make the manual analysis manageable, I reduced the total number of 711 *ne*-turns to 194 by random selection. The final dataset contained a total of 853 turns with the following distributions per tag: 192 *ja*, 194 *ne*, 246 *nicht*, 131 *gell* and 90 *oder*.

4.   Responses to tag questions

Since TQs share similarities with both assertions and questions, they can be expressed by various speech acts (cf. Clausen & Scheffler 2020b). It is thus not surprising that they allow for a wide range of response types. The latter also depend on whether TQs request or provide information. One could assume that information-requesting TQs would more likely receive a clear positive or negative response, whereas information-providing TQs would usually trigger not more than a short acknowledgment. This is in line with Clark & Schaefer's (1987) model of evidence of understanding, according to which certain contributions to conversations require more evidence of understanding. Other responses might in turn be relevant for all TQ types.

As Andersen (1998) points out, there is a potential mismatch between the speaker's intention and the addressee's reaction, hence a distinction should be made between 'tags that intend to elicit a response and those that actually elicit a response' (1998:3). He considers the possibility of this intention remaining unrecognized and/or not carried out by the addressee. However, there are also cases of the so-called 'unsolicited' responses (cf. Kimps et al. 2014:71,77), where the addressee may respond regardless of the speaker's expectation, e.g. by interrupting the speaker. So far, TQs from the addressee's perspective did not receive much attention (but see Kimps et al. 2014). In this study, I aim to include the addressee's point of view by examining the responses independently of the response-eliciting potential of each type of tag.

In accordance with these considerations, I propose a typology of responses to TQs similar to the classifications in Andersen (1998), Kimps et al. (2014), and Gómez González (2018). It includes the types *explicit positive*, *negative* and *non-committal*, *implicit positive* and *negative*, *backchannel*, *continuation*, and *ignore*, which have been mentioned in these studies,[13] as well as *clarification request* from the taxonomy by Łupkowski & Ginzburg (2013, 2017) that covers query responses to different types of questions, including TQs. The typology is further expanded with the response type *relating utterance* derived based on the CallHome data. The response types are described below with examples.[14]

4.1.   Response type typology

Explicit: the addressee provides a clear response to the TQ, which can be either *positive* (7), *negative* (8) or *non-committal* (9).

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[13] These response types occur in at least one of the three studies; however, they might be named differently there. Some of these studies contain further (sub)types, which I combined under one response type here. The choice of types in this study appears neither too fine-grained nor too scarce for the current purposes.

[14] In all examples, the tags in question are highlighted in bold and are carried over to the translation. Irrelevant tags that happen to be in the examples are not marked and are translated with their English equivalents. I preserve the original CallHome corpus notation in the examples, including symbols that mark various characteristics such as proper names, interjections, background noise etc. (e.g. &, % etc.); the reader is referred to the corpus documentation for details.

(7)   A: Die gibt es aber in &Deutschland auch, **ja**?
          'A: But they also exist in Germany, **ja**?'
          B: Ja, ja. Reichlich.
          'B: Yes, yes. Plenty.'   (ge_6247)

(8)   B: Ja, wie es doch immer der Fall ist **oder**?
          'A: Yes, as is always the case, **oder**?'
          A: Nein, das war eben oben drauf auf sein normales Gehalt.
          'A: No, that was on top of his normal salary.'   (ge_5143)

(9)   A: Ja. Na, ich habe –
          'A: Yes. Well, I – '
          B: mhm
          'B: mhm'
          A: – gedacht, die tun da, eine, eine Linse einsetzen, **ne**.
          'A: – thought they would insert a lens there, **ne**.'
          B: Ja, ich habe da auch nicht viel Ahnung.
          'B: Yes, I don't have much of a clue there either.'   (ge_5452)

Implicit: the actual response needs to be inferred from the addressee's utterance. Similar to the explicit response, it can be *positive* (10) or *negative* (11).

(10)   A: Mal so nebenbei, **ja**?
          'A: Just in passing, **ja**?'
          B: Na ja, na ja, das geht doch nicht anders. {breath} Und dann zum Zweiten will ich endlich …
          'B: Well, well, there's no other way. {breath} And then secondly I finally want to …'
                                                         (ge_4684)

(11)   B: Ja, ja, und die Welle ist okay **oder**?
          'B: Yes, yes, and the wave is okay, **oder**?'
          A: Also generell muß man sagen %äh war ich eigentlich ein bißchen enttäuscht von der Welle hier.
          'A: Well in general I have to say uh I was actually a bit disappointed with the wave here.'
                                                       (ge_6388)

Backchannel: the addressee acknowledges the TQ by producing a short utterance, such as *mm*, *aha*, *ja* ('yes') (12), an exclamation (13) or a repetition of some part of the TQ (14). Non-verbal responses transcribed in the corpus as {blowing through lips}, {laugh} and the like are also considered backchannels (15).[15]

(12)   B: {breath} Also es ist schon Original, **ja**.
          'B: {breath} Well, this is indeed an original, **ja**.'
          A: Aha, aha. Ah das ist schon prima.
          'A: Aha. aha. Ah that's really great.'   (ge_5909)

(13)   A: Oh, herrlich! Es ist echt super warm. Du schwitzt dich tot, **ja**.
          'A: Oh, wonderful! This is really super warm. You sweat like hell, **ja**.'

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[15] They count as such if they can be interpreted as stand-alone reactions to the TQ that do not overlap with other turns as per timestamps.

B: Klasse, Klasse.
'B: Great, great.' (ge_6518)

(14) A: aber wir spielen das einfach nur durch, damit wir ein bißchen scharf bleiben {chuckle}, **ja**.
'A: but we just play it through so we stay interested {chuckle}, **ja**.'
B: Scharf bleiben. {laugh} {breath} (( )) {breath}
'B: Stay interested. {laugh} {breath} {breath}' (ge_6373)

(15) A: Ja, und nicht s- so a- und gewissermaßen zwei Geschichten, **ja**.
'A: Yes, and not s- so a- and in a sense two stories, **ja**.'
B: {blowing through lips} (ge_6312)

Continuation: the speaker continues with his/her turn without a pause after uttering the TQ. No response to the TQ comes from the addressee, although s/he might respond to the whole turn.

(16) A: Also %äh sie ist sowas von goldig, das kannst du dir nicht vorstellen, **gell**.
'A: So, uh, she's so cute, you can't imagine, **gell**.'
B: {breath}
A: Die meiste Zeit sind wir echt ein Herz und eine Seele.
'A: Most of the time we are truly one heart and soul.' (ge_6219)

Ignore: the addressee ignores the TQ and talks about something else (17) or replies, but not directly to the TQ (18).

(17) A: Da kannst du für sechzig Dollar –
'A: There you can for sixty dollars –'
B: Das ist ja
'B: Well, that's '
A: – im Jahr alle Sportereignisse der Uni umsonst besuchen.
'A: – a year attend all the university sports events for free.'
B: Ah, das ist ja aber günstig, **ne**?
'B: Ah, that's cheap, **ne**?'
A: Also <English Football>, Volleyball, Basketball, <English Baseball> und so weiter.
'A: Such as football, volleyball, basketball, baseball and so on.' (ge_4957)

(18) A: Ein Bier! {laugh} Da warst du aber ganz mutig, **oder**? {laugh}
'A: A beer! {laugh} You were really brave, **oder**? {laugh}'
B: Ein &Warsteiner {breath} {laugh} Das ist ein %äh ein Pils, ne.[16]
'B: A Warsteiner {breath} {laugh}. That's a uh a Pilsner, you know.' (ge_4076)

Clarification request: the addressee signals a problem in understanding regarding the form or content of the TQ. This includes content queries (19), repetition requests (20), and relevance clarifications (21), which are, however, not differentiated in the annotation.

(19) A: Das das war also %äh. Das kostet zehn Dollar <English +Toll+> **ja**.
'A: So that was uh. That costs ten dollars toll, **ja**.'
B: Zehn Dollar?
'B: Ten dollars?' (ge_6838)

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[16] *Pils* ('Pilsner') was mistakenly transcribed in the original corpus data as *Pilz* ('Mushroom'), which I corrected here.

(20)   B: Ah, weiß ich nicht. Gobelins waren das, **ja**.
         'B: Ah, I don't know. Those were Gobelins, **ja**.'
         A: Wie?
         'A: Pardon?'   (ge_5206)

(21)   B: Ach da ist die Batterie alle, nicht, gleich, **nicht**.
         'B: Oh the battery is about to die, **nicht**.'
         A: Welche Batterie?
         'A: Which battery?'   (ge_6517)

Relating utterance: the addressee implicitly acknowledges the TQ and responds with a request or a statement relating to this TQ. Relating requests comprise all kinds of questions and requests relating to some aspect of the TQ, such as asking for further details regarding its content (22). Relating statements include, for instance, the addressee's opinion on the TQ or additional information about it (23). These subtypes are also not differentiated in the annotation.

(22)   A: Ah ja aber die K- &Laura kann auch alleine da hin, **oder**?
         'A: Ah yes but K- Laura can also go there alone, **oder**?'
         B: Ja, wie denn?
         'B: Yes, how then?'   (ge_5298)

(23)   B: Das weiß ich ja nicht mehr so, **gell**.
         'B: I don't know that anymore, **gell**.'
         A: Weiß ich auch ((nicht)). [channel breakup]
         'A: I don't know either. [channel breakup]'   (ge_5088)

Reply not clear/end of file: the addressee's response is either not clear, e.g. due to missing words in the transcription file, or is not included in the corpus data due to the end of the file.[17]

4.2. *Annotation of responses*

Per default, the response is contained in the turn uttered by the addressee that directly follows the turn with the TQ. Oftentimes, however, the response was located several turns after the TQ or, in one case, in the previous turn. The transcriptions of the conversations reflect overlaps in the interlocutors' speech due to interruptions and partially simultaneous speaking. Therefore, to determine the exact response triggered by the tag, the timestamps of the turns were taken into account.

Responses like *ja* and *okay* were annotated as backchannels if they were responses to information-sharing TQs, and as explicit positive responses in case of information-requesting TQs. The same goes for the responses that are (partial) repetitions of the tagged utterance, which can also be classified either as a backchannel or positive response depending on the class of the TQ. Positive and negative explicit responses differ between the two classes of TQs as follows: they are expressed as confirmation and refutation with information-requesting TQs and as agreement/same opinion and disagreement/contradiction with information-sharing TQs.

Initially, one German native speaker with a linguistics background annotated the response

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[17] CallHome contains transcriptions of ten-minute-long excepts from the conversations, which begin and end abruptly.

types. During the analysis of the tag questions' contexts, I also determined the response types and recorded any differences from the initial annotation. The percentage agreement ranged from 73% to 84% per tag. The annotator and myself then discussed all divergent cases until we came to an agreement on each response type.

In 12 cases (2 *ja*, 3 *nicht*, 3 *gell*, 4 *oder*), it was not possible to determine the precise nature of the context because it was either not informative enough or absent altogether if the TQ appeared in the beginning of the file. In one case, a TQ with *oder* was part of the reported speech and could not be classified either. These cases, which make up 1-2% for *ja*, *nicht* and *gell* and 6% for *oder*, were excluded from the analysis.

5.   *Discourse functions of tags*

This section provides an analysis of the functions of tags based on the contexts in which these tags occurred in the corpus data and the responses they received. I follow Farkas & Bruce (2010) in assuming that the ultimate goal of a conversation is to increase the common ground (CG), i.e. the interlocutors' shared knowledge and beliefs (cf. Stalnaker 2002). Hence, I argue that each tag fulfils some discourse function by means of which it makes the anchor proposition interact with the common ground in one way or another. The link between TQs and common ground management has been addressed in several studies. Andersen determines the tags' functions 'from the point of view of [. . .] mutual manifestness (common ground)' (2001:118). Kimps argues that 'TQs are used as markers of common ground perception and negotiation' (2018:135). She proposes two basic categories of TQs' interaction with the common ground: signaling a breach in the common ground (disalignment) and establishing common ground (alignment), each of which comprises several subcategories. However, since Kimps (2018) considers the whole TQ as the unit of analysis, her categories do not necessarily address the functions of tags and are therefore only partially suitable for the analysis pursued in this study.

I identify seven distinct discourse functions of tags, differentiated based on the level of the addressee's involvement, i.e. how much of a contribution is requested from the addressee with regard to the common ground management. I assume three general categories of how the tagged utterances interact with the common ground (cf. A-, B- and AB-events in e.g. Kimps 2018:59f.). First, the contents of an utterance can be used to inform the addressee with the goal of common ground enrichment. In this case, the speaker is the only (or main) source of information. Second, tag questions are used for common ground negotiation purposes, e.g. by comparing the speaker's and addressee's opinions on some issue. In this case, the speaker and addressee are co-sources of information and both contribute to the common ground (re-)construction. Finally, tag questions are used to indicate a knowledge gap. In this case, the addressee is seen as the (main) source of knowledge, and is asked for confirmation of the expressed proposition. The tag functions are presented in the following sections in the order of increasing addressee involvement.

5.1.   *Discourse structuring*

Tags often occur in narrative contexts. In German, this use has been reported in particular for the tag *ne* (cf. Hagemann 2009; König 2017). Following the literature, I define a narrative context

as a number of several consecutive turns[18] by the same speaker where the addressee's response is not expected.[19] Usually, a tag appears several times within a narration, but it can also be a single use, for example, within a shorter narration (24).

(24)   A: {clear throat} Ja, jetzt passe auf die Story hier. {laugh}
         'A: {clear throat} Yes, now pay attention to the story here.{laugh}'
         . . .
         A: Und %äh da habe ich durch, nja, da haben wir mal neu also im, ach das war beim &Tho- ah Geburtstag vom &Thomas. Da haben wir eine Party hier gehabt –
         'A: And uh, there I had via, well, there we had again, well in, ah that was on Tho- ah Thomas' birthday. We had a party here –'
         B: Ja.
         'B: Yes.'
         A: – und da hatte &Matthias den <English &Walter> kennengelernt, **ja**.
         'A: – and there Matthias met Walter, **ja**.'
         B: Ja, ja.
         'B: Yes, yes.'   (ge_6888)

In the above excerpt, A announces in the first line that s/he is going to tell a story, which s/he then narrates utterance for utterance letting the addressee reply with short 'yes'-utterances, but keeping the turn. One of the speaker's turns contains the tag *ja*. As this example shows, not only *ne* can have a discourse-structuring function. In fact, all of the analyzed tags appeared in this context with relatively similar distribution, except for *oder*: 57 (30%) *ja*, 36 (19%) *ne*, 69 (28%) *nicht*, 20 (15%) *gell*, and 1 (1%) *oder*. The fact that *oder* occurs only once in a narration shows that this is not a typical context for this tag, and it most likely cannot be used interchangeably with the other tags here. Example (25) demonstrates that different tags can be used with this function even by the same speaker.

(25)   B: und an dem Wochenende hat sie wie so einen Kreislaufkollaps gekriegt. Da war sie f- früh beim Friseur Freitag.
         'B: and that weekend she got like a circulatory collapse. She was e- early at the hairdresser's on Friday.'
         A: mhm
         'A: mhm'
         B: – [background talk] und ist heim und hat dann den Weg nicht geschafft, **ja**. [/background talk]
         'B: – [background talk] and went home and then didn't make it all the way, **ja**. [/background talk]'
         A: Aha.
         'A: Aha.'
         B: – und ist äh f- beinahe umgekippt, **ne**.
         'B: and uh f- almost fell down, **ne**.'
         A: uh.
         'A: uh.'

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[18] In the CallHome transcription, a turn is marked by time stamps, which does not necessarily coincide with the speaker change, but rather with a somewhat longer pause between the utterances.

[19] Oftentimes, the addressee tries to interrupt the speaker with a question or remark. Important for the identification of a narrative context is the presence of a recognizable segment of narration by the same speaker as opposed to a conversational context where the interlocutors' contributions are (more or less) equal.

B: Und das hat ein Nachbar gesehen, und hat sie da zum Arzt, und da haben sie sie untersucht, EKG gemacht, –
'B: And a neighbor saw that, and took her to the doctor, and they examined her, did an ECG, –'
B: – haben jetzt nix festgestellt, haben halt gesagt, sie soll langsam machen, **ne**.
'B: – didn't find anything, just said she should take it easy, **ne**.'
A: Aha.
'A: Aha.' (ge_5298)

Kimps (2018) includes these TQs in her category of informing TQs, which 'add information to the common ground, which is believed to be new to the co-participant by the speaker' (2018:146). However, she does not address the difference in the effect of these TQs from, for example, plain assertions on the common ground. In these TQs, the speaker is the source of and is strongly committed to the information expressed in the anchor proposition, whose content is not to be negotiated or confirmed by the addressee. In order for this information to enter the common ground, a commitment from all interlocutors is required (cf. Farkas & Bruce 2010).

Typical TQs in narrative contexts share pieces of information; some, however, share the speaker's opinions on different aspects of the discussion topic (26). In these cases, the speaker merely wishes to share his/her opinion and continue with the narration; the addressee's opinion is not in question, in fact, the addressee most likely is in no position to establish his/her own opinion due to a lack of knowledge regarding the expressed issue.

(26)   A: %äh, in, in, in, %äh, in der kleineren Größe, die ich ja vorher hatte, sieht sie sehr gut aus, sagen wir mal auf einem Rock, auf der Hose, wenn ich jetzt nur irgendwas Dünnes, Schwarzes, drunterziehe, **ja**?
'A: uh, in, in, in, uh, in the smaller size, which I had before, it looks very good, let's say with a skirt, with trousers, if I just put on something thin, black, under it, **ja**?'
B: mhm
'B: mhm' (ge_5143)

Tag questions in narrative contexts are used to enrich the common ground with new information. Whereas this function is fulfilled by the proposition in the TQs' anchor, I propose that the function of a tag is to structure the discourse. The speaker uses a tag to check the addressee's attention and make sure that the part of the narration up to this tag has been processed and successfully added to the addressee's commitments and consequently to the common ground. The tag is thus used to split the narration into more easily processable chunks of information, where the addressee is offered a chance to react before more information will follow. Usually, the lightest form of acknowledgment, i.e. the absence of contradiction or at most backchannel, is sufficient (cf. forms of mutual acceptance in Clark & Schaefer 1987). This view is reflected in the analysis of the response types these tags received in the CallHome corpus. The most common response for all tags is backchannel (78-85% for *ja*, *ne* and *gell*, 56% for *nicht* as well as for the one instance of *oder*); there is a positive correlation between the discourse-structuring function and backchannel response (Pearson's $r=.37$, $p=.0006$).[20] The second most frequent case is that of the speaker continuing his/her turn, especially after *nicht* (14% with *ja*, 11% with *ne*, 39% with *nicht* and 5% with *gell*). In some cases the addressee replied with a

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[20] The Pearson correlation coefficients for this and the subsequent contexts were calculated on the complete dataset across all tags, functions and response types using Python. Due to space constraints, I report only the significant positive correlations.

relating utterance (4% with *ja*, 8% with *ne*, 3% with *nicht* and 10% with *gell*), a response type that implicitly acknowledges the TQ content, asking for further details or expressing an opinion regarding the expressed proposition.

5.2.   Common ground acceptance

TQs are used to share information not only within narrations, but also in conversational contexts, where the speakers exchange information in turns, thus enriching the common ground step by step. TQs in this context can initiate a topic change (27) or serve as (a part of) a response to the addressee's previous utterance (28). Contrary to the narrative contexts, here the speaker usually pauses and passes the turn on to the addressee. Therefore, the function of tags in these TQs is to elicit a response that the expressed information has been successfully accepted as common ground on the addressee's part. Similar to the tags in narrative contexts, the speaker is the only source of the information and is strongly committed to the content of the expressed proposition. The addressee is usually only in the position to merely acknowledge it, unless there are reasons for objection. However, the dialogic nature of the information exchange is foregrounded here, which is why the speaker, by using a tag, encourages the addressee to respond and publicize his/her commitment.

(27)   B: Ich wollte dir wohl sagen am am letzten Mittwoch hat &Horst sein Auto Totalschaden fahren
         gefahren, **ja**.
         'B: I guess I wanted to tell you that that last Wednesday Horst totaled his car, **ja**.'
         A: Oh! Aber ihm ist hoffentlich nichts passiert?
         'A: Oh! But hopefully nothing happened to him?'   (ge_4308)

(28)   A: – meine. Sicher ihr habt nicht soviel Sonne und so im, im wiege-, na ja. Na ja, erzähle mir
         mal und wie, was machst du den ganzen Tag?
         'A: – mean. Sure you don't have that much sun and stuff in, in weigh-, well. Well, tell me and
         how, what do you do all day?'
         B: Ja, ich bin ja Rentner, **nicht**. Das weißt du ja.
         'B: Well, I'm retired, **nicht**. You know that.'
         A: Ja. Aha.
         'A: Yes. Uh-huh.'   (ge_6311)

In many cases, TQs contain information complementary to the speaker's own previous utterance(s). These TQs highlight some additional point or emphasize what has been said (29).

(29)   B1: Kostet euch das Telefongespräch nix und kriegt noch zehn Dollar?[21]
         'B1: Does the phone call cost you nothing and you still get ten dollars?'
         A: Nichts, Vater, nein. Die haben aber gesagt, we-, wenn, bevor es zu Ende ist, die halbe Stunde,
         dann sagen sie, dann muß man aufhören, **gell**.
         'A: Nothing, father, no. But they said, wh-, when, before it's over, the half hour, then they say,
         then you have to stop, **gell**.'
         B: Ja, na ja, eine halbe Stunde, da kann man sich ja viel sagen.
         'B: Yes, well, in half an hour a lot can be said.'   (ge_4711)

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[21] In this excerpt, speaker A has two interlocutors on the other end of the phone line: B1 asking the question and B responding to the TQ uttered by A. This fact does not affect the described TQ functions.

Occasionally, the speaker repeats his/her own utterance, even in cases where the addressee has already provided a confirmational response. This can happen for different reasons, for instance, if the addressee did not react the first time (30) or to signal a consolidation of opinion on the speaker's side (31). This confirms the view that by using a tag in this context, the speaker wishes to elicit a (more convincing) expression of the addressee's acceptance of the presented information as part of the common ground.

(30) B: Nur, daß sie angeblich nach &Linz geht und so ohne &Reinhold, also da werden da wer-, sind wir schon alle neugierig, ja.
'B: Only that she's supposedly going to Linz and without Reinhold, so there will be there wil-, we are all very curious, yes.'
A: Ohne den &Reinhold nach &Linz?
'A: Without Reinhold to Linz? '
B: Sind wir schon irre neugierig, **nicht**.
'B: We are really curious, **nicht**.'
A: {laugh} (ge_6140)

(31) A: Aber das ist doch ganz gut oder nicht? Habt ihr, %äh findet ihr die %äh Anschaffung wertvoll oder %äh
'A: But that's pretty good, isn't it? Do you, uh, do you find the uh purchase worthwhile or uh'
B: Ja. Ja die finden wir wertvoll. Das haben inzwischen ja auch nun ganz viele Leute auch noch wieder zusätzlich, nicht.
'B: Yes. Yes, we find it valuable. In the meantime, quite a lot of people also have that, you know.'
A: Gut. Ja.
'A: Good, yes.'
B: Und das, na doch wir finden, wir finden es schon wertvoll **nicht**.
'B: And that, well yes we find, we find it indeed valuable **nicht**.'
A: Das ist ja super, das [distortion]
'A: That's great, that [distortion]' (ge_6517)

All tags except for *oder* occurred with this TQ type: 68 (35%) *ja*, 96 (49%) *ne*, 135 (55%) *nicht* and 57 (44%) *gell*. The most common responses to these TQs are backchannel (40-54% per tag) and positive (19-24% per tag). The third most frequent type of response is relating utterance (10-14% per tag). The tag *nicht* is used frequently with continuation as well (14%), which is slightly more often compared to the other tags, where the speaker kept his/her turn in 6-9% of cases.

5.3.   Common ground strengthening

Speakers also use TQs to 'demonstrate understanding', i.e. to show that they relate to the addressee's opinion and support or share his/her point of view. More specifically, the speaker may express confirmation (32), justification (33) or some kind of re-interpretation of the addressee's utterance (34). TQs of this type are always reactions to the addressee's previous utterance(s).

(32) A: Vergiß es! Und, und denke nicht mehr dran. Aber nein, ich konnte es nicht vergessen.
'A: Forget it! And, and don't think about it anymore. But no, I couldn't forget.'

B: {laugh} Ja, das nagt dann, **gell**?
'B: {laugh} Yes, it gnaws at you then, **gell**?'   (ge_5143)

(33)   A: Kommst du überhaupt nirgendwo rein, wenn du vor eine Kirche kommst sogar in in &Boston in in die ganz berühmte <Engl. &Tracy Church> –
        'A: Can't get in anywhere at all, if you get in front of a church even in in Boston in in the very famous Tracy Church –'
        . . .
        A: – ((schön)) zugeschlossen, alles.
        'A: – it's all closed.'
        B: Ja. Zu gefährlich, **nicht**? Ja.
        'B: Yes. Too dangerous, **nicht**? Ja.'   (ge_4002)

(34)   B: Die sind widerstandsfähig. [channel noise] Das macht denen nix mehr, nicht.
        'B: They are resilient. [channel noise] That doesn't do anything to them anymore, huh.'
        A: Macht denen nichts mehr, nein, %äh, irgendwie, %äh, ist das Serum, %äh, nicht mehr wirksam, **ja**?
        'A: Doesn't do anything to them, no, uh, somehow uh, is the serum, uh, no longer effective, **ja**?'
                                                                                      (ge_5776)

This type of TQ coincides with the acknowledging TQs in Kimps (2018:168ff.) and partly overlaps with her confirming TQs (2018:172ff.). They are used to signal that the speaker shares the common ground with the addressee, and consequently to strengthen it. The function of a tag in these TQs is to demonstrate that 'the speaker is in the position to commit as well' (Kimps 2018:169). Thus, using a TQ is a stronger way of expressing agreement with the speaker than, for instance, by means of an assertion. This increases the bond between the interlocutors, signaling that the addressee arrived at the same (or similar) opinion/conclusion on his/her own, and is committed to the proposition independently from the speaker.

In the corpus data, all tags except for *oder* occurred with this function. *Gell* was found in this context 21 (16%) times. The other three tags occurred less frequently: 12 (6%) *ja*, 14 (7%) *ne*, 13 (5%) *nicht*. The fact that *oder* is not used in this context is not surprising; it confirms its tendency to specialize, although not exclusively, for contexts of speaker uncertainty (cf. Clausen & Scheffler 2020b). These TQs received no response (ignored or the speaker kept his/her turn) in one third (33%) of the cases. This is not unexpected as the speaker essentially confirms the addressee's point of view. However, since many of these TQs express further information, the tag does seem to exert some pressure on the addressee to respond. Whereas positive responses are most common with the tags *ja* (58%) and *gell* (67%), backchanneling is a typical reaction to *nicht*-TQs (46%). TQs with *ne* were mostly ignored by the addressee (36%).

5.4.   *Common ground negotiation*

TQs are used to share and exchange opinions in discussions where both the speaker and addressee are in a position to make up their minds on the issue under discussion, i.e. they are co-sources of information. With this type of TQ, the speaker is committed towards the proposition, and is interested in the addressee's opinion. Typically, based on previous discussions or some pre-existing common ground between the interlocutors, the speaker expects that the addressee's commitment would be the same or at least similar. I propose that the function of a tag

in this context is to establish points of agreement on the expressed proposition (cf. the 'seeking agreement' context in Malamud & Stephenson 2014:279f.) and negotiate the common ground. In (35), the interlocutors are discussing a place they both know, which provides a pre-existing common ground, and it is clear that the speaker anticipates agreement with his/her opinion.

(35)   A: Es gibt ganz normal. So ist es halt. {laugh} Siehst du. Na, auf jed-, auf jeden Fall, %äh, wir, wir sind, wir, also wir gehen nach &Gärtlenburg hier vom Samstag bis zum nächsten Sonntag, ne!
        'A: It is totally normal. That's just the way it is. {laugh} You see. Well, in an-, in any case, uh, we, we are, we, so we are going to Gärtlenburg here from Saturday till next Sunday, right!'
        …
        B: Und, ach, das sieht bestimmt toll aus dort. Ist ja eine herrliche Gegend, **gell**.
        'B: And, oh, that must look great there. It's a beautiful area, **gell**.'
        A: Ja, ja.
        'A: Yes, yes.'   (ge_5566)

In CallHome, all tags occurred in this context, although only in a handful of cases: 5 (3%) with *ja*, 6 (3%) with *ne*, 4 (2%) with *nicht*, 7 (5%) with *gell* and 7 (8%) with *oder*. The most frequent response type is positive for every tag except *nicht*, which is most common with backchannels. Negative responses do not seem very typical, as they occurred only twice, once with *ja* and once with *ne*.

5.5.   Common ground reassurance

In a number of cases, the tags, 7 (4%) *ja*, 1 (1%) *ne*, 1 (1%) *gell* and 1 (1%) *oder*, appeared in TQs that were repetitions of (some part of) the addressee's previous utterance (36) or, in one case, of the speaker's own question after it was positively answered by the addressee (37).

(36)   B: Jetzt hat er fast gar keine Haare mehr. {laugh}
        'B: Now he has almost no hair at all. {laugh}'
        A: Jetzt hat er keine mehr **oder**?
        'A: He doesn't have any now **oder**?'
        B: ähm, ja, aber die sind jetzt glaube ich naturfarben oder? {laugh}
        'B: um, yes, but I think they're his natural color now, aren't they? {laugh}'   (ge_6297)

(37)   B: Ja, ja also es ist ein süßes Kind. Hat sie dir mal ein Bildchen geschickt?
        'B: Yes, yes so it is a cute child. Has she sent you a picture?'
        A: Ja.
        'A: Yes.'
        B: Gell, sie hat dir ein Bildle geschickt, **ja**?
        'B: Right, she sent you a picture, **ja**?'
        A: Ja, ja.
        'A: Yes, yes.'   (ge_5909)

In these contexts, the speaker seems to use a tag question as a way of reassuring him-/herself of the correct interpretation of the addressee's commitment. Whereas the utterance is repeated in the anchor of a TQ, the tag offers the addressee a possibility to react before the proposition will be accepted as shared knowledge. I define the function of a tag in these contexts as com-

mon ground reassurance, i.e. the speaker wishes to receive a re-confirmation of the addressee's commitment before the proposition will become common ground. These TQs mostly received positive responses (57% of *ja*-TQs, as well as the *ne-* and *oder*-TQs). The remaining 43% of the *ja*-TQs were ignored by the addressee, signaling that s/he does not necessarily see the need for additional confirmation. In the *gell*-TQ, the speaker continued with his/her turn.

5.6.   *Verification of proposition's truth*

Another type of TQs in which all of the examined tags occurred is assumptions on different aspects of the current topic of discussion. In the majority of cases, an assumption expressed in the anchor can be classified as such only on the basis of the larger prior context. The assumptions in the corpus data were based on one of the following grounds: addressee's narration/previous utterance (38), general knowledge[22]/speaker's own previous experience (39), pre-existing common ground between the interlocutors (40), information acquired prior to the conversation from some other source (41), or direct evidence[23] (42).

(38)   A: Du sprichst jetzt von Freitagmorgen, **ne**?
        'A: You're now talking about Friday morning, **ne**?'
        B: Vom Freitagmorgen, ja.
        'B: About Friday morning, yes.'   (ge_4765)

(39)   B: Aha, aha, also Ablösung Hornhautablösung ist das, **ja**?
        'B: Aha, aha, so that's detachment corneal detachment, **ja**?'
        A: Die Retina i-, ich weiß nicht ob das die Hornhaut ist.
        'A: The retina I-, I don't know if that's the cornea.'   (ge_5909)

(40)   A: Genau, du bist dann zum &Plangg gegangen, **oder**. Ja.
        'A: Right, you went to Plangg then, **oder**. Ja '
        B: Ich bin zum &Plangg gegangen, der war sehr nett, der hat seinen Segen gegeben, und das war es dann.
        'B: I went to Plangg, he was really nice, he gave his blessing, and that was it then.'   (ge_6140)

(41)   A: Bei euch ist es auch ziemlich heiß, **gell**?
        'A: Where you are, it's also pretty hot, **gell**?'
        B: Jetzt ja, hast du es gehört?
        'B: Now yes, have you heard that?'
        A: Ja ja. Ich habe hier &Deutsche &Welle, Internet-Nachrichten.
        'A: Yea, yea. I have Deutsche Welle here, internet news.'   (ge_4073)

(42)   B: Ich ich höre jetzt da hinten grade so (( )) Schreie, **oder**?
        'B: I I hear screaming back there right now, **oder**?'
        A: Ja das sind nur die paar Idioten auf meinem Flur.
        'A: Yeah that's just the couple of idiots in my hallway.'   (ge_5123)

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[22] I understand general knowledge as 'all common knowledge and beliefs learned in one's life, language and culture' (Kimps 2018:134).

[23] In a small number of cases, the assumptions referred to some event that took place during the conversation. I treat these cases as a temporary change of the discussion topic and analyze them together with the other assumptions on the current topic of discussion.

Assumptions represent a typical case of TQs that has been described in the literature as indicating speaker uncertainty and asking for confirmation. These TQs make the speaker's commitment to the proposition dependent on the addressee's response, who is seen as the source of knowledge and therefore in a position to bridge the gap (Kimps 2018:137f.). They are comparable with Kimps's (2018) category of TQs that signal a breach in the common ground with the speaker as origin due to doubt in presupposed knowledge or counter-expectation.

In the corpus data, the assumptions derived from the addressee's narration or the information received from some external source are used to check whether the proposition is true. The former arise from the speaker's interpretations of the addressee's utterance(s). The addressee as the source of information is asked to confirm whether the speaker has understood him/her correctly. The latter are cases where the speaker verifies with the addressee, whether information received from some other source is correct, as the speaker is assumed to have direct access to this information. In other types of assumptions, namely those based on the pre-existing common ground between the interlocutors or on general knowledge, the speaker is technically a co-source of information. These are cases where the speaker may have doubts or has a reason to believe that the commitment of the addressee regarding the proposition changed, and therefore wishes to clarify the current state of affairs and (re-)confirm the common ground.

The most common tag in this context is *oder*, it occurred with assumptions 76 (84%) times. The other tags were used here to a considerably lesser extent: 26 (13%) *ja*, 38 (20%) *ne*, 19 (8%) *nicht* and 16 (12%) *gell*. The distribution of tags across the different assumption types is presented in Table 1. The tags *ja*, *gell* and *oder* behave similarly: They appear in assumptions based on the addressee's narration in ca. 60% of the cases. The tags *nicht* and *ne* are alike in that they are both distributed more or less evenly across the three most common assumption types (the first three rows in the table), which is in contrast to *ja*, *gell* and *oder*. The assumptions based on the addressee's narration are most frequent overall.

ground for assumption	*ja*	*ne*	*nicht*	*gell*	*oder*
addressee's narration	16 (62%)	13 (34%)	8 (42%)	10 (63%)	45 (59%)
general knowledge	4 (15%)	10 (26%)	6 (32%)	4 (25%)	17 (22%)
pre-existing common ground	3 (12%)	10 (26%)	5 (26%)	1 (6%)	11 (15%)
information from other source	2 (8%)	4 (11%)	–	1 (6%)	2 (3%)
direct evidence	1 (4%)	1 (3%)	–	–	1 (1%)
total	26	38	19	16	76

Table 1: Distribution of different types of assumptions per tag.

In accordance with Kimps (2018:137ff.), I propose that the function of tags appearing in TQs that constitute assumptions is to elicit a response as to whether the proposition in the TQ anchor (still) holds true, thus clarifying the state of the common ground with respect to this issue.

The most common type of response to assumptions is positive: 49-69% per tag (the least with *oder* and the most with *gell*). Negative responses are present for all tags as well, however they are most frequent with *oder* (26%); the frequencies for other tags range from 6-10%. In a number of cases, the addressee chooses to ignore the speaker's request (16% with *nicht* and 3-8% with the rest of the tags), but cases where the speaker chooses to continue without waiting for a response are rare (one occurrence with *ne* and *oder*, respectively).

A positive correlation was observed for these TQs (all assumption types considered together)

with both negative (r=.31, p=.002) and positive (r=.33, p=.003) responses. Specifically, assumptions based on general knowledge correlated positively with negative responses (r=.25, p=.005). This shows that general knowledge cannot be equally assumed for all interlocutors. By contrast, common ground arising from the interlocutors' existing relationships[24] allows for 'safer' assumptions: Assumptions based on the pre-existing common ground correlated positively with positive response types (r=.18 p=.05). The addressee's narration triggered assumptions that correlated positively with both positive (r=.26, p=.006) and negative responses (r=.19, p=.02), which signals that the addressee's utterances might not always be interpreted as intended and misunderstandings are indeed common. In addition, significant results were found for *oder*, which correlated positively with assumptions in general (r=.54, p=<.001) and in particular with assumptions based on general knowledge (r=.23, p=.01) and on the addressee's narration (r=.43, p<.001).

5.7. *Proposed action acceptance*

Three of the tags appeared in the context of directives, i.e. requests and commands to perform some action (43): 9 (5%) *ja*, 1 (0.4%) *nicht*, and 2 (2%) *gell*. TQs with *ja* and *gell* constitute imperatives as well as declaratives, the *nicht*-TQ is formulated as a declarative.

(43)   B: Klingelt [distortion] noch mal, **ja**.
        'B: Ring the bell once more, **ja**.'
        A: #((Ja, ja))#.
        'A: Yes, yes.'   (ge_6517)

Furthermore, the tags *ja*, in 4 (2%) cases, and *gell*, in 1 (1%) case, appeared in commissives, i.e. utterances by means of which the speaker commits to carrying out some action (44).

(44)   A: Ja, wir ich gucke mal was i- was wir so haben, schicke ich dir dann, **ja**.
        'A: Yes, we I will check what I- what we have, I'll send it to you then, **ja**.'
                                                                         (ge_5596)

These types of TQs refer to a desired action exchange rather than information exchange (cf. Kimps et al. 2014; Kimps 2018; Kimps et al. 2019). The proposition in the TQ anchor expresses the requested/offered action, whereas the tag appeals to the addressee. This type of tag and its functions have received little attention so far (but see Kimps et al. 2014:81f.; Scheffler & Malamud in prep. for an analysis of imperative tag questions in English). They are also left out in Kimps's (2018:129ff.) common ground-related analysis of TQs.

Beyssade & Marandin argue that by uttering a directive the speaker commits him-/herself to the outcome, 'the actualization of which more or less directly depends on addressee' (2006:47). In the case of commissives, the speaker commits to a proposed action and wishes for agreement from the addressee. One could assume that tags in directive-TQs have a stronger response-elicitation potential compared to commissives, which require less involvement from the addressee. I propose that in both directives and commissives the function of a tag is to elicit a (verbal) commitment to the offered or requested future action, which is to be carried out by either the speaker or the addressee. This would result in expanding the common ground with

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[24] The interlocutors in the CallHome corpus are family members and friends.

the information about the expected future action. However, I leave a detailed examination of these tags for future research.

According to Kimps et al. (2019:95), a verbal response is not obligatory here, but rather the elicitation of the action itself is relevant. In the CallHome corpus, the nature of possible requests is constrained by the medium, so that verbal responses are foreseeable. Nonetheless, some of the TQs were indeed either ignored by the addressee (1 with *gell* and *ja* in directives, respectively; 1 with *ja* in commissives) or the speaker continued with his/her turn (1 with *ja* in directives and commissives, respectively). Most of these TQs received a positive response (5 *ja* and 2 *gell*), but backchannels and negative responses were present as well.

5.8. Remaining cases

This category comprises several remaining cases (1-2% per tag) that did not fit into any of the above-described categories. The tags *ja*, *ne*, *nicht* and *gell* appeared in set phrases (45) two times each. The tag *gell* occurred in a wish (46), and the tag *ne* in an apology (47). Here, the tags seem to have a function of eliciting some kind of confirmation or acceptance, however due to a very small number of occurrences, I leave the analysis of these cases for future research.

(45)   B: Wie es so schön heißt, **ja**. [background noise]
         'B: As the saying goes, **ja**. [background noise]'   (ge_5298)

(46)   B: Ja, na ja, dann wünsche ich dir, daß das bald wieder gut wird, **gell**?
         'B: Yes, well, then I wish for you that it will soon be well again, **gell**?'   (ge_4073)

(47)   B: Entschuldigung, wenn i-, ich frage dich einfach so, **ne**.
         'B: Sorry if I-, I'm just asking you like that, **ne**.'   (ge_4764)

6. Discussion and conclusion

In the present study, I explored the distribution of the most common German tags *ja*, *ne*, *nicht*, *gell* and *oder* in spontaneous conversations. I examined the discourse contexts and responses of these tags, and identified seven functions categorized based on the addressee's involvement in the process of common ground management: discourse structuring, common ground acceptance, common ground strengthening, common ground negotiation, common ground reassurance, verification of proposition's truth, and proposed action acceptance. These functions reflect different ways in which tags can interact with the common ground. They range from the discourse-structuring function that does not require any response from the addressee to the functions that rely heavily on the addressee's feedback for common ground construction, such as verification of proposition's truth.

An overview of the distribution of these functions per tag is provided in Table 2. It shows that *oder* clearly sets itself apart from the other tags. The analysis has revealed its incompatibility with a number of functions where the other four of the examined tags can be used interchangeably. First, *oder* appears to be infelicitous in contexts where (the anchors of) tag questions are used for common ground enrichment – in narrations and information-sharing TQs in conversations. There, tags have either a discourse-structuring function or the function of eliciting a signal

discourse function	*ja*	*ne*	*nicht*	*gell*	*oder*
discourse structuring	57 (30%)	36 (19%)	69 (28%)	20 (15%)	1 (1%)
CG acceptance	68 (35%)	96 (49%)	135 (55%)	57 (44%)	–
CG strengthening	12 (6%)	14 (7%)	13 (5%)	21 (16%)	–
CG negotiation	5 (3%)	6 (3%)	4 (2%)	7 (5%)	7 (8%)
CG reassurance	7 (4%)	1 (1%)	–	1 (1%)	1 (1%)
verification of *p*'s truth	26 (13%)	38 (20%)	19 (8%)	16 (12%)	76 (84%)
proposed action acceptance	13 (7%)	–	1 (0.4%)	3 (2%)	–
not classifiable	4 (2%)	3 (2%)	5 (2%)	6 (5%)	5 (6%)
total	192	194	246	131	90

Table 2: Distribution of discourse functions per tag. Not classifiable instances include unclassified cases (unclear/not enough context) and the remaining cases from Section 5.8.

of acceptance of the expressed information as common ground by the addressee. Second, *oder* does not appear with the function of common ground strengthening. Both of these cases have in common a strong speaker commitment towards the proposition expressed in the TQ anchor and, more importantly, require no confirmation from the addressee regarding the propositional content of the utterance. The speaker either communicates information and his/her opinions to the addressee or signals that s/he shares the addressee's opinion, at which the speaker, however, (would have) arrived independently. Thus, *oder* is infelicitous in contexts where the role of the addressee in the common ground management is backgrounded. This is in line with the findings in Clausen & Scheffler (2020b) that *oder* prefers speaker uncertainty and is rather felicitous in contexts where a clarifying response from the addressee is anticipated.

In the context of assumptions, where the tags are used to verify the proposition's truth, all tags are possible. *Nicht*, however, was found to be least frequent in this context in the examined data. A closer look at different assumption types reveals that *nicht* and *gell* are most restrictive and do not work well with certain types of assumptions. *Oder*, on the contrary, appears almost exclusively (in over 80% of the cases) with this function. The functions of common ground negotiation and common ground reassurance can be performed by all tags as well, albeit with certain restrictions: In the former, *oder* is most frequent, whereas in the latter virtually only *ja* is common and *nicht* occurrences are absent altogether. However, due to very few tag questions found in these contexts in the corpus data, the possibility of *nicht* should not be excluded, and more analysis is necessary to draw further conclusions. The function of proposed action acceptance is also represented by very few examples and calls for further research. A comprehensive analysis of the use of direct and indirect directive and commissive speech acts with tag questions could shed more light on the behavior of different tags in these contexts.

Due to the high interchangeability of the examined tags, no clear one-to-one mapping of the tags to functions and response types is possible. Nonetheless, certain tendencies were identifiable; they are reflected by the correlation coefficients, although due to the small amount of data many of these correlations are not significant. With regard to responses, backchannels and positive responses are most frequent overall. The tags *ne* and *ja* each elicited backchanneling ca. 40% of the time and a positive response in about one-fourth of cases. These two response types were elicited by *nicht* and *gell* in about one third of cases each. Furthermore, *nicht* appears to be the most common tag used by speakers when they do not aim at eliciting a response: 21%

of cases vs. 3-9% with the other tags. *Oder* received positive responses in 43% of cases with significant correlation (r=.15, p=.038). However, it differs from the rest of the tags in that it elicits negative responses more frequently (18% vs. 0.8-3% with the other tags). Its correlation with negative responses was found to be significant (r=.31, p=.0006) as well.

The presented results demonstrate the importance of taking into account the context and responses in the analysis of the discourse functions of question tags. Analyzing tags as common ground management devices allows to disentangle the function of a tag from that of the utterance it co-occurs with. This gives a better understanding of how interlocutors structure the discourse and manage the common ground, and provides a basis for a unified account of tags within the framework of the commitment-based models of discourse.

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Koto-ga RTOs
A new perspective on raising-to-object constructions in Japanese

Yuya Noguchi

There has been a controversy in the literature about how the raising-to-object construction (RTO) in Japanese should be analyzed. This paper sheds new light on this issue by exploring a novel variant of RTOs that I refer to as *koto-ga* RTOs, which have gone unacknowledged. More specifically, I discuss properties of *koto-ga* RTOs and propose an analysis for them. Furthermore, I show that the proposed analysis of *koto-ga* RTOs gives a new perspective on the issue of how the Japanese RTO in general should be analyzed.

1. Introduction

In Japanese, the subject of some declarative finite clauses embedded with the complementizer *to* can be marked with the accusative Case *-o*, as well as with the nominative Case *-ga*, as exemplified in (1).

(1) a.   Ken-wa [Mai-ga   kasiko-i   to] omotta.
            Ken-TOP Mai-NOM smart-PRES C   thought
            'Ken thought that Mai is smart.'
    b.   Ken-wa Mai-o   kasiko-i   to omotta.
            Ken-TOP Mai-ACC smart-PRES C thought
            'Ken thought Mai to be smart.'

Note that the subject of the embedded predicate from (1), *kasiko-* 'smart', cannot be marked accusative in matrix clauses, as shown in (2).

(2)   Mai{-ga/*-o}   kasiko-i.
        Mai-NOM/-ACC smart-PRES
        'Mai is smart.'

This suggests that the accusative marking of the embedded clause subject of (1b), namely *Mai*, is licensed by the matrix predicate *omotta* 'thought', or more precisely, the matrix *v*. Following the literature, and given their similarity with English ECM constructions (see the translation of (1b); e.g. Lasnik & Saito 1991; Bošković 1997), this paper will refer to

constructions like (1b) as *raising-to-object constructions* (*RTOs*).[1] Also, constructions like (1b) will sometimes be called *standard RTOs*, to distinguish them from other variants of RTOs. Since Kuno (1976), Japanese RTOs have been discussed in a number of previous works (Kaneko 1988; Hoji 1991; Sakai 1996, 1998; Bruening 2001; Hiraiwa 2001, 2005; Tanaka 2002; among many others). The issue of how to analyze them is, however, still contentious. Against this backdrop, this paper aims to shed new light on this issue. For this purpose, this paper deals with constructions like (3), which can be viewed as a variant of RTOs (see Section 4.1).

(3)   (*)Ken-wa Mai-no   koto-ga   kasiko-i   to omotta.
        Ken-TOP Mai-GEN matter-NOM smart-PRES C thought
        'Ken thought Mai to be smart.'

(3) is characterized by the following: (i) the semantically-vacuous formal noun *koto* (which originally means *fact/matter*; see Section 3) follows the embedded clause subject, which bears the genitive Case *-no*, and (ii) *koto* is marked with the nominative Case *-ga*. Given these traits, this paper will refer to constructions like (3) as koto-ga *RTOs*. It is worth noting here that *koto-ga* RTOs have actually been judged as ill-formed in the literature (e.g. Kuno 1976; Homma 1988; Hoji 1991: Fukuda 1994; Kishimoto 2018; Nakajima 2018), which is why '(*)' is appended to (3). However, many speakers find it acceptable. Given that, the following discussion should be understood as building on the grammar of the speakers who allow sentences like (3). At any rate, due to this issue, this construction has not been explored in the literature. This paper will investigate properties of *koto-ga* RTOs and propose an analysis for them. I will further show that the proposed analysis of *koto-ga* RTOs provides new evidence for the analysis of Japanese RTOs proposed by Bruening (2001) and Hiraiwa (2005).

The paper is organized as follows: To establish the baseline for the ensuing discussion, Section 2 discusses some properties of standard RTOs, and shows that those properties can be captured by two different analyses proposed in the literature. Section 3 gives an overview of the semantically-vacuous formal noun *koto* and discusses how it is licensed. Section 4 proposes an analysis of *koto-ga* RTOs and shows that the proposed analysis lends support to one of the two analyses of RTOs introduced in Section 2. Section 5 concludes the paper.

2. Baseline: standard RTOs

This section illustrates the controversial status of the previous analyses of RTOs in Japanese. Section 2.1 applies three diagnostics to reveal important properties of standard RTOs. Section 2.2 shows that these properties can be captured by two different analyses of RTOs proposed in previous studies.

2.1. Properties of standard RTOs

This subsection unveils some properties of standard RTOs that are particularly important in considering how to analyze them. For this purpose, I introduce three diagnostics: (i) the T-*dake* diagnostic, (ii) the placement of matrix adverbs, and (iii) the placement of embedded

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[1] This terminology is not intended to imply that the logical embedded clause subject in this construction always raises to the matrix object position.

adverbs.

The first diagnostic is what this paper will refer to as the *T*-dake *diagnostic*, which capitalizes on the focus particle *dake* 'only'. This particle can follow not only a noun phrase but also a tensed predicate, as shown in (4) and (5), respectively.

(4) a.   Mai-<u>dake</u>-ga   kasiko-i.
          Mai-only-NOM smart-PRES
          'Only Mai is smart.'
     b.   Mai-<u>dake</u>-wa kasiko-i.
          Mai-only-TOP smart-PRES
          'Only Mai is smart.'

(5) a.   Mai-ga   kasiko-i   <u>dake</u> da.
          Mai-NOM smart-PRES only COP
          'Only Mai is smart.'   [✓only > Mai / ✓Mai > only]
     b.   Mai-wa kasiko-i   <u>dake</u> da.
          Mai-TOP smart-PRES only COP
          'Mai is only smart.'   [*only > Mai / ✓Mai > only]

Kishimoto (2009) observes that the two sentences in (5) are different in the possible scope relationships between the logical subject (i.e. *Mai*) and *dake*; *dake* can take scope over the subject when it is marked with the nominative Case as in (5a), but not when it is marked with the topic particle as in (5b). That is, the interpretation of (4a) is available in (5a), while that of (4b) is not in (5b). To capture this, Kishimoto (2009) assumes that when *dake* follows a tensed predicate, it is adjoined to T and thus takes scope over TP. Given this, I refer to *dake* attached to a tensed predicate as *T*-dake. Based on this assumption, Kishimoto argues that the subjects in (5) are located in different positions; the nominative subject in (5a) is located within TP (e.g. Spec,TP), while the topicalized subject in (5b) is above TP (e.g. Spec,CP/Top(ic)P). The structures of (5a) and (5b) can be roughly represented as in (6a) and (6b), respectively.

(6) a.   [TP Mai-ga   kasiko-i   dake] da.
              Mai-NOM smart-PRES only   COP
     b.   Mai-wa$_i$ [TP e_i kasiko-i   dake] da.
          Mai-TOP   smart-PRES only   COP

In a nutshell, Kishimoto (2009) utilizes T-*dake* as a diagnostic to examine whether a given element is located below or above TP.

Kishimoto (2018) extends this diagnostic to RTOs to pin down the position of the accusative phrase in RTOs. The relevant data are given in (7), showing that T-*dake* in the complement clause can take scope over the logical embedded subject if it is marked with the nominative Case (7a), but not if it is marked with the accusative Case (7b).

(7) a.   Ken-wa [Mai-ga   kasiko-i   <u>dake</u> da to] omotta.
          Ken-TOP Mai-NOM smart-PRES only COP C thought
          'Ken thought that only Mai is smart.'   [✓only > Mai / ✓Mai > only]
     b.   Ken-wa Mai-o   kasiko-i   <u>dake</u> da to omotta.
          Ken-TOP Mai-ACC smart-PRES only COP C thought
          'Ken thought Mai to be only smart.'   [*only > Mai / ✓Mai > only]

This indicates that the logical embedded subject in (7a) is positioned within TP of the complement clause, while the one in (7b) is above that TP. The rough structure of (7a) and (7b) is then as in (8a) and (8b), respectively. ((8) does not represent the CP of the complement clause, which is headed by *to*, since what is important at this point is that the accusative is higher than the TP.)

(8) a. Ken-wa [TP Mai-ga   kasiko-i   dake da] to omotta.
         Ken-TOP   Mai-NOM smart-PRES only COP C thought
    b. Ken-wa Mai-o_i [TP e_i kasiko-i   dake da] to omotta.
         Ken-TOP Mai-ACC   smart-PRES only COP C thought

Thus, the T-*dake* diagnostic indicates that the accusative phrase in RTOs is located at least above TP of the complement clause.[2]

The second diagnostic is the placement of matrix adverbs. Kuno (1976) insightfully observes that the accusative phrase in RTOs can either follow or precede a matrix adverb, as shown in (9).

(9) a. Ken-wa <u>orokanimo</u> Mai-o   kasiko-i   to omotta.
         Ken-TOP stupidly   Mai-ACC smart-PRES C thought
         'Ken stupidly thought Mai to be smart.'
    b. Ken-wa Mai-o   <u>orokanimo</u> kasiko-i   to omotta.
         Ken-TOP Mai-ACC stupidly   smart-PRES C thought

Of particular importance is (9b); the possibility of the accusative phrase preceding a matrix adverb indicates that the accusative phrase can appear in the matrix clause.

The third diagnostic is the placement of embedded adverbs. It has been observed that the accusative phrase in RTOs can either precede or follow an embedded adverb (e.g. Hiraiwa 2001; Kobayashi & Maki 2002), as shown in (10).

(10) a. Ken-wa Mai-o   <u>toodaisei-kurai</u>   kasiko-i   to omotta.
         Ken-TOP Mai-ACC student.of.Tokyo.Univ-as smart-PRES C thought
         'Ken thought Mai to be as smart as a student of Tokyo University.'
    b. Ken-wa <u>toodaisei-kurai</u>   Mai-o   kasiko-i   to omotta.
         Ken-TOP student.of.Tokyo.Univ-as Mai-ACC smart-PRES C thought

The well-formedness of (10b), where the accusative phrase follows the embedded adverb,

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[2] Kishimoto (2009) argues that the scope of *dake* 'only' is calculated with respect to a certain element at LF, which means that even an element that covertly moves out of TP can take scope over T-*dake*. For example, T-*dake* in (ia) cannot take scope over the *wa*-marked contrastive topic, despite the fact that the contrastive topic surfaces in its theta position. Note that *dake* can be overtly attached to the contrastive topic phrase as shown in (ib), suggesting that the interpretation unavailable in (ia) (i.e. 'only > Ken') is in principle possible.

(i) a. Mai-ga   Ken-wa sikat-ta   dake da.
         Mai-NOM Ken-TOP scold-PAST only COP
         'Mai only scolded Ken (but not the others).'   [*only > Ken / √ Ken > only]
    b. Mai-ga   Ken-<u>dake</u>-wa sikat-ta.
         Mai-NOM Ken-only-TOP scold-PAST
         'Mai scolded only Ken (but not the others).'

Based on this observation, Kishimoto (2009) argues that a contrastive topic covertly moves to Spec,CP, where it takes scope over T-*dake* in (ia). Hence, applying this diagnostic to RTOs, as done in Kishimoto (2018), reveals that the accusative phrase is located above TP, but does not specify whether it is located there in the overt syntax.

shows that the phrase in question can surface within the complement clause, with the assumption that an adjunct cannot be scrambled across a clause-boundary (Saito 1985).

To recap, the above three diagnostics reveal the following properties of the accusative phrase in RTOs:

(11) a. The accusative phrase is located above TP of the complement clause.
    b. The accusative phrase can surface in the matrix clause.
    c. The accusative phrase can surface in the complement clause.

Let us now elaborate on (11). The fact that the accusative phrase appears either in the matrix (11b) or the complement clause (11c) can be captured by assuming that it optionally undergoes movement. More specifically, the accusative phrase, which should originate within the complement clause, can stay within that clause, but it can also move to the matrix clause.[3,4] When the accusative phrase undergoes movement to the matrix clause, it is obviously located above TP of the complement clause, which is compatible with (11a). When it stays within the complement clause, on the other hand, it should be located above TP, given (11a). This position should arguably be Spec,CP of the complement clause.[5] Based on these considerations, I conclude that the accusative phrase in RTOs has the characteristics summarized in (12).[6]

(12) a. The accusative phrase can undergo optional movement; it either stays within the complement clause, or moves to the matrix clause.
    b. When the accusative phrase stays within the complement clause, it is located in Spec,CP of the complement clause.

2.2. Two possible analyses

I will now show that the analyses of RTOs represented in (13) capture (12a-b).

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[3] Takahashi (2018) argues against the optional movement analysis and maintains that the accusative phrase in RTOs always moves to the matrix clause (see also Kuno 1976; Sakai 1996, 1998; Tanaka 2002). Concerning the fact that the accusative phrase can follow an embedded adverb as in (10b), he claims that an embedded adverb can merge with the accusative phrase and that the amalgamated element undergoes A-movement to the matrix clause; under this analysis, (10b) would not support the view that the accusative phrase can stay within the complement clause. His claim is mainly based on the data in (i), where both the embedded adverb (i.e. *gakkyuuiin-kurai* 'as a class representative') and the accusative phrase precede the matrix adverb (i.e. *tuyoku* 'strongly'), indicating that both the two elements appear in the matrix clause. (The grammaticality judgment of (i) is his.)

(i)   (?) Mary-ga   <u>gakkyuuiin-kurai</u>   Hanako-o   <u>tuyoku</u>   mazime-da   to omot-tei-ru.
        Mary-NOM class.representative-as Hanako-ACC strongly earnest-PRES C think-PROG-PRES
        'Mary strongly thinks Hanako to be as earnest as a class representative.'   (Takahashi 2018: 74)
However, the grammaticality status of (i) seems to be dubious. Given this, this paper leaves open the plausibility of Takahashi's proposal and thus relies on the widely accepted view that the placement of embedded adverbs serves as a diagnostic for the position of the accusative phrase in RTOs.

[4] Other arguments for the optional movement of the accusative phrase in the literature concern multiple clefts (Hiraiwa 2001) and indeterminate pronoun binding (Hiraiwa 2005).

[5] See H. Saito (2018) for an argument for this view based on indexical shifting in Japanese.

[6] This paper leaves open what the nature of the optional movement of the accusative phrase is (e.g. raising: Bruening 2001; Hiraiwa 2001, 2005 vs. scrambling: Bruening 2001; M. Kuno 2002; Taguchi 2009, 2015).

(13)   a.   Analysis A (see, e.g., Kaneko 1988; Bruening 2001; Hiraiwa 2005):
               NP1-NOM [$_{CP}$ NP2-ACC$_i$ [$_{TP}$ … t_i …] C] V
               $\Rightarrow$ NP1-NOM NP2-ACC$_i$ [$_{CP}$ t_i [$_{TP}$ … t_i …] C] V (optional)
       b.   Analysis B (see, e.g., Bruening 2001; M. Kuno 2002; Taguchi 2009, 2015):
               NP1-NOM [$_{CP}$ NP2-ACC$_i$ [$_{TP}$ … *pro*$_i$ …] C] V
               $\Rightarrow$ NP1-NOM NP2-ACC$_i$ [$_{CP}$ t_i [$_{TP}$ … *pro*$_i$ …] C] V (optional)

According to Analysis A (13a), the accusative phrase originates in the theta position in the complement clause, and it undergoes (obligatory) movement to Spec,CP of the complement clause. From that position, it can undergo optional movement to the matrix clause.[7] According to Analysis B (13b), on the other hand, the accusative phrase is base-generated in Spec,CP, and the theta position is occupied by the corresponding *pro*. It can further undergo optional movement to the matrix clause, as in Analysis A.[8] Note that the crucial difference between the two analyses in (13) is whether the accusative phrase originates in the theta position (13a) or Spec,CP (13b).[9]

   Before finishing this section, I will discuss a more specific version of Analysis A that is proposed by Bruening (2001) and Hiraiwa (2005), anticipating the following discussion. Their proposal, which I call Analysis A', is summarized in (14).

(14)   Analysis A' (Bruening 2001; Hiraiwa 2005):

$$\overset{\underleftarrow{\text{Move(optional)}}}{\text{NP1-NOM } v \text{ [}_{CP} \text{ NP2-ACC}_i \text{ C [}_{TP} t_i \text{ T [}_{XP} t_i \text{ X}_{(=predicate)}\text{…]]]}}$$

                      Agree   Agree   (word order irrelevant)
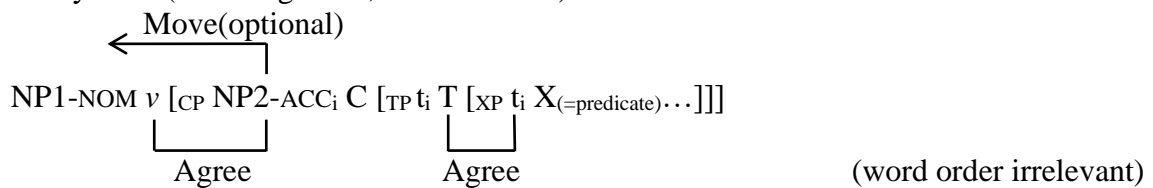
Under this analysis, the accusative phrase undergoes Agree twice; the first Agree relationship is established with T in the complement clause when it originates in its theta position, while the second with *v* in the matrix clause after it moves to Spec,CP of the embedded clause (so the Phase Impenetrability Condition (PIC; Chomsky 2000) is not violated). In Section 4, I will argue that the analysis of *koto-ga* RTOs proposed in this paper parallels Analysis A'.

3. The semantically-vacuous formal noun koto

This section deals with the semantically-vacuous formal noun *koto*, which is a significant ingredient for *koto-ga* RTOs. Section 3.1 introduces one of its important properties related to its distribution, namely the fact that it can be added only to surface objects. Section 3.2 discusses the licensing of the formal noun and claims that it is licensed by Agree with *v*.

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[7] Kaneko (1988) argues that the accusative phrase is licensed in Spec,CP in the complement clause, but does not note whether it may move to the matrix clause.

[8] Yoo (2018) argues that Analysis B applies to Korean RTOs.

[9] Bruening (2001) argues that both (13a) (or (14), more precisely) and (13b) are possible for RTOs in Passamaquoddy and Japanese. More specifically, he argues that (13b) applies when the accusative phrase undergoes A-movement (i.e. raising) to the matrix clause, while (13a) applies when it does not, staying within the complement clause. According to him, the former is the case because the movement of the accusative phrase to the edge of the complement clause (as shown in (13a)) cannot feed A-movement due to the ban on improper movement, with the assumption that the movement to the edge position counts as an A'-movement.

3.1. Restricted distribution

Note first that *koto* comes in two types: contentful and obligatory *koto*, and semantically vacuous and optional *koto* (see, e.g., Sasaguri 1996, 1998; Kinjo & Sasaguri 1999). The former *koto* keeps its original meaning 'matter/fact' and thus its presence is obligatory for a sentence to express this particular meaning, as exemplified in (15).

(15) Ken-wa Mai*(-no koto)-o   {hanasita / setumeisita / gironsita}.
        Ken-TOP Mai-GEN matter-ACC talked   explained   discussed
        'Ken {talked about / explained / discussed} matters about Mai.'

The latter *koto*, on the other hand, does not have any significant semantic content and is thus optionally added to a noun phrase, with the help of the genitive Case *-no* (although the noun phrase must be animate). For instance, the example in (16) has the same meaning regardless of whether or not *koto* is present.

(16) Ken-wa Mai(-no koto)-o   {aisiteiru / hometa / tataita}.
        Ken-TOP Mai-GEN matter-ACC love   praised patted
        'Ken {loves / praised / patted} Mai.'

Given their obligatoriness/optionality, this paper refers to the first and second type of *koto* as *koto*ob(ligatory) and *koto*op(tional), respectively.

One important property of *koto*op concerns its distribution: 'only a "surface" direct object can qualify as a phrase to which [*koto*op] may be added' (Kishimoto 2004:114) (see, e.g. Kuno 1976; Sasaguri 1996, 1998; Kinjo & Sasaguri 1999; Takano 2003; Kishimoto 2004). More specifically, *koto*op can appear on an accusative object (see (16) and (17a)) and a nominative object (see (17b)), but not on the subject of transitive verbs (see (18a)), unergative verbs (see (18b)), unaccusative verbs (see (18c)) and passivized verbs (see (18d)).[10]

(17) a.   Ken-wa Mai(-no koto)-o   tataita.
              Ken-TOP Mai-GEN matter-ACC patted
              'Ken patted Mai.'
        b.   Ken-wa Mai(-no koto)-ga   sukida.
              Ken-TOP Mai-GEN matter-NOM like
              'Ken likes Mai.'

(18) a.   Ken(*-no koto)-ga   Mai-o   tataita.
              Ken-GEN matter-NOM Mai-ACC patted
              'Ken patted Mai.'
        b.   Ken(*-no koto)-ga   hasitta.
              Ken-GEN matter-NOM ran
              'Ken ran.'

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[10] According to Sasaguri (1996, 1998) and Kinjo & Sasaguri (1999), *koto*op can be easily added to the object of psychological verbs, such as *aisiteiru* 'love' and *sukida* 'like', while other verbs, such as *tataku* 'pat', need to be followed by a modal auxiliary, such as *-teyaru* 'for the benefit of somebody' when their object is followed by *koto*op. In fact, they judge as '?*' examples like (17a), whose predicate is *tataita* 'patted'. However, many speakers, including the author, judge (17a) as fine. Hence, I do not take into consideration possible difference in the availability of *koto*op that would depend on the predicate. See, e.g., Hidaka (2003) for this issue.

   c.   Ken(*-no koto)-ga   taoreta.
          Ken-GEN matter-NOM fell.down
          'Ken fell down.'
   d.   Ken(*-no koto)-ga   Mai-niyotte tatak-are-ta.
          Ken-GEN matter-NOM Mai-by   pat-PASS-PAST
          'Ken was patted by Mai.'

3.2. Licensing koto$_{op}$

Although the above distribution of *koto*$_{op}$ has been descriptively observed in the literature, it was left open how *koto*$_{op}$ is licensed to appear with such restricted distribution. More specifically, it is still unclear what property of surface objects allows *koto*$_{op}$ to occur with them. Given the nature of surface direct objects, the following three hypotheses are reasonable to consider:

(19) a.   *Koto*$_{op}$ is licensed when it (or the surface object involving it) surfaces in the theta position of a transitive verb (e.g. the position for Theme/Patient role).
      b.   *Koto*$_{op}$ is licensed when it (or the surface object involving it) surfaces in Spec,*v*P.
      c.   *Koto*$_{op}$ is licensed when it (or the surface object involving it) has a syntactic relation, such as Agree, with (transitive) *v*.

To evaluate (19a-c), let us consider the construction that I call koto-o *RTOs* like (20), which is semantically identical with the standard RTO (1b), repeated below.

(20) Ken-wa Mai-no koto-o   kasiko-i   to omotta.
      Ken-TOP Mai-GEN matter-ACC smart-PRES C thought
      'Ken thought Mai to be smart.'

(1)   b.   Ken-wa Mai-o   kasiko-i   to omotta.
          Ken-TOP Mai-ACC smart-PRES C thought
          'Ken thought Mai to be smart.'

Notice that the only difference between (20) and (1b) is whether *koto* appears on the accusative phrase. For the purpose of the current discussion, it is important to note that (i) *koto* in (20) is *koto*$_{op}$, rather than *koto*$_{ob}$, and that (ii) (20) is syntactically analyzed in the same way as (1b). Below I demonstrate these two points.

    The first point can be shown to hold if the semantic contribution of the two types of *koto* is taken into consideration; *koto*$_{ob}$ expresses its original meaning *matter/fact*, while *koto*$_{op}$ does not have any significant semantic contribution (see Section 3.1). Given that, if *koto* in (20) were *koto*$_{ob}$, the accusative phrase *Mai-no koto*(-o) would literally mean *matters/facts about Mai*, yielding the gibberish sentential meaning *Ken thought matters/facts about Mai to be smart*. This thus shows that *koto* in (20) is *koto*$_{op}$. This conclusion is further compatible with the fact that (20) is semantically identical with (1b); this follows from the fact that (i) *koto* in (20) is *koto*$_{op}$ and thus semantically vacuous, and that (ii) the only difference between the two sentences is the presence/absence of *koto*.

    Let us now turn to the second point that (20) is syntactically analyzed in the same way as (1b) (cf. Section 2.2). This point is confirmed by the fact that (20) parallels (1b) regarding the

diagnostics from Section 2, the T-*dake* diagnostic and the placement of matrix and embedded adverbs. More specifically, (i) both the accusative phrase in (1b) and that in (20) cannot be under the scope of T-*dake*, (ii) they precede or follow a matrix adverb, and (iii) they follow or precede an embedded adverb; compare (7b), (9) and (10), repeated below, with (21), (22) and (23), respectively.

(7) b. Ken-wa Mai-o   kasiko-i   <u>dake</u> da to omotta.
        Ken-TOP Mai-ACC smart-PRES only COP C thought
        'Mai thought Ken to be only smart.'   [*only > Mai / √ Mai > only]

(9) a. Ken-wa <u>orokanimo</u> Mai-o   kasiko-i   to omotta.
        Ken-TOP stupidly   Mai-ACC smart-PRES C thought
        'Ken stupidly thought Mai to be smart.'
    b. Ken-wa Mai-o   <u>orokanimo</u> kasiko-i   to omotta.
        Ken-TOP Mai-ACC stupidly   smart-PRES C thought

(10) a. Ken-wa Mai-o   <u>toodaisei-kurai</u>   kasiko-i   to omotta.
         Ken-TOP Mai-ACC student.of.Tokyo.Univ-as smart-PRES C thought
         'Ken thought Mai to be as smart as a student of Tokyo University.'
     b. Ken-wa <u>toodaisei-kurai</u>   Mai-o   kasiko-i   to omotta.
         Ken-TOP student.of.Tokyo.Univ-as Mai-ACC smart-PRES C thought

(21) Ken-wa Mai-no   koto-o   kasiko-i   <u>dake</u> da to omotta.
     Ken-TOP Mai-GEN matter-ACC smart-PRES only COP C thought
     'Ken thought Mai to be only smart.'   [*only > Mai / √Mai > only]

(22) a. Ken-wa <u>orokanimo</u> Mai-no   koto-o   kasiko-i   to omotta.
         Ken-TOP stupidly   Mai-GEN matter-ACC smart-PRES C thought
         'Ken stupidly thought Mai to be smart.'
     b. Ken-wa Mai-no   koto-o   <u>orokanimo</u> kasiko-i   to omotta.
         Ken-TOP Mai-GEN matter-ACC stupidly   smart-PRES C thought

(23) a. Ken-wa Mai-no   koto-o   <u>toodaisei-kurai</u>   kasiko-i   to
         Ken-TOP Mai-GEN matter-ACC student.of.Tokyo.Univ-as smart-PRES C
         omotta.
         thought
         'Ken thought Mai to be as smart as a student of Tokyo University.'
     b. Ken-wa <u>toodaisei-kurai</u>   Mai-no   koto-o   kasiko-i   to
         Ken-TOP student.of.Tokyo.Univ-as Mai-GEN matter-ACC smart-PRES C
         omotta.
         thought

These parallels indicate that both *koto-ga* RTOs like (20) and standard RTOs like (1b) should be analyzed in the same way (see Section 2.2 for details of the analyses for standard RTOs).[11]

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[11] Some previous works (e.g., Homma 1988; Fukuda 1994; Kishimoto 2018) argue, however, that *koto-o* RTOs do not have either of the structures in (13)/(14) (i.e. they differ from standard RTOs) and should be analyzed as in (i), where the *koto-o* phrase is base-generated as an argument in the matrix clause (similarly to the

Given those two points, it is now reasonable to consider that (20) is obtained simply by adding *koto*op to the accusative phrase in (1b). Bearing this assumption in mind, let us now consider which of the three hypotheses in (19), repeated below, is more plausible.

(19) a.   *Koto*op is licensed when it (or the surface object involving it) surfaces in the theta position of a transitive verb (e.g. the position for Theme/Patient role).
      b.   *Koto*op is licensed when it (or the surface object involving it) surfaces in Spec,*v*P.
      c.   *Koto*op is licensed when it (or the surface object involving it) has a syntactic relation, such as Agree, with (transitive) *v*.

Before discussing the issue, it is worth noting that the embedded predicate *kasiko-* 'smart' in (20), repeated below, should have nothing to do with the licensing of *koto*op.

(20) Ken-wa Mai-no   koto-o   kasiko-i   to omotta.
      Ken-TOP Mai-GEN matter-ACC smart-PRES C thought
      'Ken thought Mai to be smart.'

This should be the case given that *kasiko-* 'smart' is a predicate that takes an internal argument as its sole argument; it patterns with unaccusative verbs, whose argument cannot be followed by *koto*op, as shown in (18c). This point is further confirmed by the fact that the content of the complement clause in (20) cannot be realized as a matrix clause without dropping *koto*op, as shown below:

(24) Mai(*-no koto)-ga   kasiko-i.
      Mai-GEN matter-NOM smart-PRES
      'Mai is smart.'

If the predicate *kasiko-* 'smart' were involved in the licensing of *koto*op, (24) should be grammatical even without dropping *koto*op. This observation in turn indicates that the matrix predicate *omotta* 'thought' should be involved in the licensing of *koto*op in (20). Given that, the following discussion will focus only on the domain above the embedded predicate.

Let us begin with the first hypothesis (19a). Given that *koto*op can appear on the accusative phrase in RTOs as established above, (19a) predicts that that accusative phrase should surface in a theta position. Recall here that, as discussed in Section 2, there are two positions that the accusative phrase of RTOs can surface, which depends on whether it undergoes optional movement. If the movement does not apply, it stays in Spec,CP of the complement clause. Note that this position is not a theta position. If the optional movement applies, on the other hand, it moves to a position within the matrix clause. This landing site, however, should not be a theta position of the matrix predicate, if movement to a theta position is banned. The accusative phrase in RTOs thus does not surface in a theta position, which rules out the hypothesis (19a).

Let us next focus on the second hypothesis (19b). This hypothesis predicts that the *koto-o*

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prolepsis analysis; see, e.g., Saito 1983; Hoji 1991; Mihara 1994; Takano 2003).
(i)   Ken-wa Mai-no   koto-oi   [*pro*i kasiko-i   to] omotta.
       Ken-TOP Mai-GEN matter-ACC   smart-PRES C thought
Notice, however, that the fact that the accusative phrase in *koto-o* RTOs can follow an embedded adverb (see (23b)), as in standard RTOs (see (10b)), cannot be captured by (i), where the accusative phrase never appears in the complement clause. Given that, I take the current observation that *koto-o* RTOs pattern with standard RTOs to suggest that the former can be analyzed in parallel with the latter.

phrase in (20) should be located in Spec,*v*P of the matrix predicate. Recall, however, that the *koto-o* phrase in (20) can follow an embedded adverb, as shown in (23b), repeated below.

(23) b. Ken-wa <u>toodaisei-kurai</u>   Mai-no   koto-o   kasiko-i   to
         Ken-TOP student.of.Tokyo.Univ-as Mai-GEN matter-ACC smart-PRES C
         omotta.
         thought

This shows that the *koto-o* phrase can stay within the complement clause (with the assumption that adjuncts cannot be scrambled across a clause-boundary; Saito 1985). This indicates that *koto*op in (20) can be licensed even if it is located within the complement clause, which eliminates the hypothesis (19b).

Consider, then, the hypothesis (19c). Suppose that the syntactic relationship noted in (19c) is Agree. Then, (19c) predicts that *koto*op can be licensed even if it is positioned non-locally with respect to *v*, given that Agree holds between one element and the other that it c-commands. This prediction is borne out by (23b), which shows that *koto*op can appear despite the fact that the *koto-o* phrase stays within Spec,CP of the complement clause; it is not local with respect to the matrix *v*. Therefore, I conclude that (19c) is the most plausible hypothesis of the three in (19) and propose that *koto*op is licensed by Agree with *v*.

4. Koto-ga *RTOs*

Building on the discussion so far, this section turns to the main concern of this paper, namely *koto-ga* RTOs. The example of this construction (3) is repeated as (25) (where '(*)' is eliminated from (3) for the reason discussed above).

(25) Ken-wa Mai-no   koto-ga   kasiko-i   to omotta.
     Ken-TOP Mai-GEN matter-NOM smart-PRES C thought
     'Ken thought Mai to be smart.'

Section 4.1 will reveal some characteristics of *koto-ga* RTOs by investigating the following two questions: (i) What happens if we apply the three diagnostics introduced in Section 2 to *koto-ga* RTOs? (ii) Which of the two T's, matrix T or embedded T, is associated with the nominative Case of the *koto-ga* phrase? Based on the properties of *koto-ga* RTOs obtained in Section 4.1, Section 4.2 will then propose an analysis of *koto-ga* RTOs. Section 4.3 shows that the proposed analysis of *koto-ga* RTOs lends support for Analysis A, or more precisely, Analysis A' of RTOs, discussed in Section 2.

4.1. Properties of koto-ga *RTOs*

Before exploring properties of *koto-ga* RTOs, let us first confirm that sentences like (25) count as a variant of RTOs. Notice first of all that *koto* in (25) should be viewed as *koto*op, rather than *koto*ob; the logical embedded subject in (25) refers to the specific person *Mai*, rather than matters/facts about her, given the meaning of (25) (see its translation). The question, then, is how *koto*op is licensed in (25). Recall here that the embedded predicate in (25), *kasiko-* 'smart', is not involved in the licensing of *koto*op; the formal noun cannot appear

on the argument of *kasiko-* in matrix clauses, as shown in (24), repeated below.

(24) Mai(*-no koto)-ga   kasiko-i.
       Mai-GEN   matter-NOM smart-PRES
       'Mai is smart.'

This indicates that *koto*~op~ in (25) is licensed from the matrix clause. Recall that I proposed in Section 3 that *koto*~op~ is licensed by Agree with *v*. Given that, *koto*~op~ in (25) should be licensed if the embedded subject *Mai* undergoes Agree with the matrix *v*. It is then reasonable to assume that *koto-ga* RTOs like (25) are a variant of standard RTOs like (1b) and *koto-o* RTOs like (20), repeated below, in that the logical embedded subject in all the three is associated (i.e. undergoes Agree) with the matrix *v*.

(1)   b.   Ken-wa Mai-o   kasiko-i   to omotta.
             Ken-TOP Mai-ACC smart-PRES C thought
             'Ken thought Mai to be smart.'

(20) Ken-wa Mai-no   koto-o   kasiko-i   to omotta.
       Ken-TOP Mai-GEN matter-ACC smart-PRES C thought
       'Ken thought Mai to be smart.'

The crucial difference between (25), on one hand, and (1b) and (20), on the other, however, is the Case marking pattern; the logical embedded subject of (25) is marked with the nominative Case -*ga*, while the one in the latter is marked with the accusative Case -*o*.

    Given the above discussion, two important questions arise concerning *koto-ga* RTOs: (i) What happens if we apply the diagnostics discussed in Section 2 to *koto-ga* RTOs, namely the T-*dake* diagnostic and the placement of matrix and embedded adverbs? (ii) Which of the two T's, matrix T or embedded T, is associated with the nominative Case of the *koto-ga* phrase in *koto-ga* RTOs (under the standard assumption that nominative Case is licensed by T)?

    Let us first deal with the first question. First, *koto-ga* RTOs parallel standard/*koto-o* RTOs with respect to the T-*dake* diagnostic; when T-*dake* appears in the complement clause of a *koto-ga* RTO, it cannot take scope over the logical embedded subject, namely the *koto-ga* phrase, as in standard/*koto-o* RTOs. The relevant example is shown in (26) (compare it with (7b) and (21)).

(26) Ken-wa Mai-no   koto-ga   kasiko-i   <u>dake</u> da to omotta.
       Ken-TOP Mai-GEN matter-NOM smart-PRES only COP C thought
       'Ken thought Mai to be only smart.'   [*only > Mai / √Mai > only]

This indicates that the *koto-ga* phrase is positioned above TP of the complement clause. Second, *koto-ga* RTOs are dissociated from standard/*koto-o* RTOs with regard to the placement of a matrix adverb; unlike the accusative phrase in standard/*koto-o* RTOs, the *koto-ga* phrase in *koto-ga* RTOs can only follow a matrix adverb, as shown in (27) (compare it with (9) and (22)).

(27) a.   Ken-wa <u>orokanimo</u> Mai-no   koto-ga   kasiko-i   to omotta.
             Ken-TOP stupidly   Mai-GEN matter-NOM smart-PRES C thought
             'Ken stupidly thought Mai to be smart.'

b. *Ken-wa Mai-no koto-ga orokanimo kasiko-i to omotta.
   Ken-TOP Mai-GEN matter-NOM stupidly smart-PRES C thought

This fact indicates that the *koto-ga* phrase of *koto-ga* RTOs cannot surface in the matrix clause and must stay within the embedded clause. Finally, *koto-ga* RTOs pattern with standard/*koto-o* RTOs regarding the placement of an embedded adverb; the *koto-ga* phrase can either precede or follow the embedded adverb, as shown in (28) (compare it with (10) and (23)).

(28) a. Ken-wa Mai-no koto-ga toodaisei-kurai kasiko-i to
       Ken-TOP Mai-GEN matter-NOM student.of.Tokyo.Univ-as smart-PRES C
       omotta.
       thought
       'Ken thought Mai to be as smart as a student of Tokyo University'
   b. Ken-wa toodaisei-kurai Mai-no koto-ga kasiko-i to
       Ken-TOP student.of.Tokyo.Univ-as Mai-GEN matter-NOM smart-PRES C
       omotta.
       thought

The above observation reveals two properties of the *koto-ga* phrase of *koto-ga* RTOs: (i) it is located above TP of the complement clause, and (ii) it must stay within the complement clause, i.e., it cannot undergo the optional movement that can apply to the accusative phrase of standard/*koto-o* RTOs. Taking this into consideration, the position where the *koto-ga* phrase surfaces should be Spec,CP of the complement clause. I argue that *koto-ga* RTOs have the rough structure in (29).[12]

(29) NP1-NOM [CP NP2- GEN *koto*-NOM [TP …] C] V

Let us now turn to the second question regarding *koto-ga* RTOs: Which of the two T's, namely the matrix T or the embedded T, is associated with the nominative Case of the *koto-ga* phrase? To explore this question, I here introduce (s)ase causative constructions like (30b), where the causative affix *-sase-* 'make' takes (the propositional counterpart of) (30a) as its complement.[13]

(30) a. Mai-wa keeki-o tabe-ta.
       Mai-TOP cake-ACC eat-PAST
       'Mai ate cake.'
   b. Ken-wa Mai-ni$_i$ [$_{vP}$ PRO$_i$ keeki-o tabe]-sase-ta.
       Ken-TOP Mai-DAT cake-ACC eat-make-PAST
       'Ken made Mai eat cake.'

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[12] This paper leaves open the interesting question why the *koto-ga* phrase in *koto-ga* RTOs cannot move to the matrix clause, in contrast to the accusative phrase in standard RTOs and *koto-o* RTOs. See, however, fn.15, for a possible account of this.

[13] For expository purposes, I assume that the causee argument in (s)ase causative constructions (e.g. *Mai-ni* in (30b)) appears in the matrix clause and PRO appears in the subject position of the complement clause. The argument will not be affected even if it is assumed that the causee argument originates in Spec,*v*P of the complement clause and then moves to the matrix clause to receive the causee theta-role (Saito 2001, 2009).

Notice that the complement clause of -(*s*)*ase*- 'make' in (30b) does not contain the tense morpheme that is present in the original sentence (30a) (i.e. *-ta*). Given this, following Murasugi & Hashimoto (2004) and Saito (2009), I assume that -(*s*)*ase*- takes *v*P, rather than TP, as its complement, as in (30b). This assumption is supported by (31b), where the nominative object construction from (31a) is embedded as the complement clause of the (*s*)*ase* causative construction.

(31) a.   Mai-wa kono mondai{-ga/*-o}   wakat-ta.
           Mai-TOP this   question-NOM/-ACC understand-PAST
           'Mai understood this question.'
     b.   Ken-wa Mai-ni$_i$ [$_{vP}$ PRO$_i$ kono mondai{*-ga/-o}   wakar]-ase-ta.
           Ken-TOP Mai-DAT   this   question-NOM /-ACC understand-make-PAST
           'Ken made Mai understand this question.'

(31a) shows that the object of the verb *wakat*- 'understand', namely *kono mondai* 'this problem', cannot be marked with the accusative Case, it must be nominative. The opposite pattern is observed, however, when -(*s*)*ase*- takes (31a) as its complement clause as in (31b); the object of *wakar*- 'understand' cannot be marked with the nominative Case but must be accusative, unlike (31a). This fact can be accounted for if it is assumed that the clause size of the complement clause of (*s*)*ase* causative constructions is *v*P, with the assumption that in nominative object constructions like (31a), T licenses the nominative Case on the object; the nominative Case cannot appear on *kono mondai* 'this question' in (31b) since the complement clause lacks its licensor, namely T.

   With this much background, let us now observe the case where a *koto-ga* RTO is embedded as the complement clause of a (*s*)*ase* causative construction. Given the above illustration of (*s*)*ase* causative constructions, the following prediction follows: On one hand, if the nominative Case on the *koto-ga* phrase of *koto-ga* RTOs is licensed by the matrix T, *koto-ga* RTOs cannot be realized as the complement clause of a (*s*)*ase* causative construction, since the T in question would not be present in the *v*P-size complement clause and thus the nominative Case on the *koto-ga* phrase could not be licensed. On the other hand, if the nominative Case on the *koto-ga* phrase is licensed by the embedded T, *koto-ga* RTOs can occur as the complement clause of a (*s*)*ase* causative construction; the absence of the matrix T is orthogonal to the licensing of the nominative Case of the *koto-ga* phrase. With this prediction in mind, witness the relevant data in (32b), where the *koto-ga* RTO in (32a) (= (25)) is embedded as the complement clause of -(*s*)*ase*-.

(32) a.   Ken-wa Mai-no   koto-ga   kasiko-i   to omotta.
           Ken-TOP Mai-GEN matter-NOM smart-PRES C thought
           'Ken thought Mai to be smart.'   (= (25))
     b.   ?Erika-wa Ken-ni$_i$ [$_{vP}$ PRO$_i$ Mai-no   koto-ga   kasiko-i   to
            Erika-TOP Ken-DAT   Mai-GEN matter-NOM smart-PRES C
            omow]-ase-ta.
            think-make-PAST
           'Erika made Ken think Mai to be smart.'
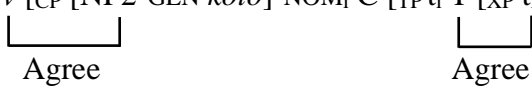
Given the well-formedness of (32b), I conclude that the nominative Case on the *koto-ga* phrase in *koto-ga* RTOs is licensed by the embedded T, rather than by the matrix T.

   To recap, this subsection has revealed the following two characteristics of *koto-ga* RTOs:

(33) a. The *koto-ga* phrase is located in Spec,CP of the complement clause and cannot undergo optional movement to the matrix clause.

    b. The nominative Case of the *koto-ga* phrase is associated with the embedded T, not with the matrix T.

4.2. The analysis of koto-ga *RTOs*

Building on the observation of *koto-ga* RTOs in the last subsection ((33), in particular), I propose that *koto-ga* RTOs have the structure in (34).[14]

(34) NP1-NOM v [$_{CP}$ [NP2-GEN *koto*]-NOM$_i$ C [$_{TP}$ t$_i$ T [$_{XP}$ t$_i$ X$_{(=predicate)}$…]]]

            Agree   Agree   (word order irrelevant)

Importantly, (34) shows that the *koto-ga* phrase originates in the theta position of the predicate of the complement clause (i.e. *X* in (34)). This assumption builds on the observation in Section 4.1 that the nominative Case of the *koto-ga* phrase is licensed by the embedded T; if we assume that Case is licensed through Agree, the *koto-ga* phrase should be base-generated in a position below the embedded T, which is arguably the theta position of the embedded predicate. Furthermore, I argue that after undergoing Agree with T, the *koto-ga* phrase moves to Spec,CP of the complement clause and there it undergoes Agree with the matrix *v*, which should be possible given that it is located in the edge of the phase, avoiding a violation of the PIC. The presence of this Agree relationship is evidenced by the presence of *koto*$_{op}$; recall that in Section 3.2 I argued that *koto*$_{op}$ is licensed by Agree with *v*.[15]

4.3. Implication

This subsection turns back to the issue of the analysis of Japanese RTOs. In Section 2, I discussed two analyses of RTOs from the literature that capture the diagnostics discussed in that section, namely the T-*only* diagnostic and the placement of matrix and embedded adverbs. These two analyses are repeated below:

(13) a. Analysis A (see, e.g., Kaneko 1988; Bruening 2001; Hiraiwa 2005):
        NP1-NOM [$_{CP}$ NP2-ACC$_i$ [$_{TP}$ … t$_i$ …] C] V
        $\Rightarrow$ NP1-NOM NP2-ACC$_i$ [$_{CP}$ t$_i$ [$_{TP}$ … t$_i$ …] C] V (optional)

---

[14] I simply assume that in (34) the *koto-ga* phrase moves to Spec,TP before it moves to Spec,CP, leaving open whether this is indeed the case since this does not really matter for the current discussion.

[15] Based on the structure in (34), I would like to suggest a possible account of the question why the *koto-ga* phrase cannot move to the matrix clause, unlike the accusative phrase in standard RTOs and *koto-o* RTOs (see fn.12). As noted in fn.6, it is contentious whether the optional movement applied to the logical embedded subject in RTOs is raising (i.e. object shift) (e.g. Bruening 2001; Hiraiwa 2001, 2005) or scrambling (e.g. Bruening 2001; M. Kuno 2002; Taguchi 2009, 2015). If the movement is object shift, the *koto-ga* phrase cannot undergo it if object shift only affects accusative-marked nominals. If the movement is scrambling, on the other hand, we can assume that subjects that are morphologically marked with the nominative Case are in general banned from undergoing scrambling (cf. Saito 1985). Under these accounts, the *koto-ga* phrase in *koto-ga* RTOs is prevented from moving to the matrix clause, while the accusative phrase in the other types of RTOs is allowed to undergo the movement.

b.   Analysis B (see, e.g., Bruening 2001; M. Kuno 2002; Taguchi 2009, 2015):
      NP1-NOM [CP NP2-ACC$_i$ [TP … *pro$_i$* …] C] V
      $\Rightarrow$ NP1-NOM NP2-ACC$_i$ [CP *t$_i$* [TP … *pro$_i$* …] C] V (optional)

I further repeat below Analysis A', a more specific version of Analysis A which is proposed by Bruening (2001) and Hiraiwa (2005):

(14) Analysis A' (Bruening 2001; Hiraiwa 2005):

NP1-NOM *v* [CP NP2-ACC$_i$ C [TP t$_i$ T [XP t$_i$ X$_{(=predicate)}$…]]]

        Agree   Agree   (word order irrelevant)
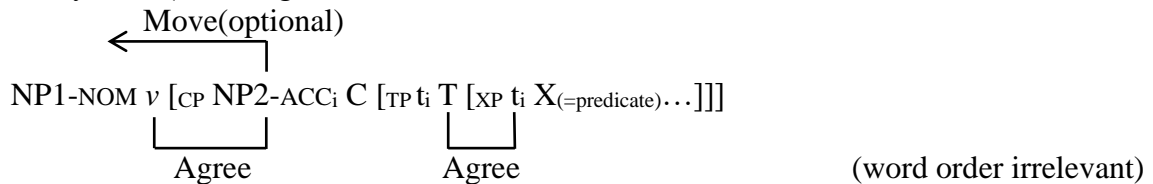
As described in Section 2.2, what differentiates the two analyses in (13) is the position where the accusative phrase originates; in Analysis A (13a), it originates in the theta position of the predicate in the complement clause, whereas in Analysis B (13b), it originates in Spec,CP of the complement clause. Recall here that I argued in the last subsection that the *koto-ga* phrase of *koto-ga* RTOs is base-generated in the theta position of the embedded predicate (see (34)). This proposal thus lends support to Analysis A, given that *koto-ga* RTOs count as a variant of RTOs (see Section 4.1). Recall further that according to the proposed analysis of *koto-ga* RTOs, the *koto-ga* phrase undergoes two instances of Agree, one with the embedded T and the other with the matrix *v*, as represented in (34). Notice that with respect to this 'double Agree', (34) parallels Analysis A' (14). Therefore, the proposed analysis of *koto-ga* RTOs can be taken to constitute evidence for Analysis A'.[16]

This last point is significant given that no direct evidence from Japanese for the 'double Agree' in (14) has been put forth in the literature. E.g., Hiraiwa (2005), who proposes Analysis A' for Japanese RTOs, notes that in Cuzco Quechua, when the embedded subject raises to the matrix clause, it is marked not only with the genitive Case, which is assigned in the complement clause, but also with the accusative Case, which is assigned in the matrix clause, as (35b) shows.

(35) Cuzco Quechua
      a.   Maryyacha numa-n Xqancha-q(*-ta) platanu ranti-na-n-ta.
            Maria   want-3 Juan-GEN-ACC   banana exchange-NML-3-ACC
            'Malia wants Juan to buy bananas.'
      b.   Maryyacha Xqancha-q*(-ta) numa-n platanu ranti-na-n-ta.
            Maria   Juan-GEN-ACC   want-3 banana exchange-NML-3-ACC
            'Malia wants Juan to buy bananas.'   (Lefebvre & Muysken 1987: 144)

Hiraiwa uses this fact to support the plausibility of assuming the two instances of Agree in Analysis A'. Beyond this cross-linguistic consideration, however, he does not submit any direct Japanese-internal evidence for the point in question. Against this backdrop, the current proposal can be viewed as a new piece of *Japanese-internal morphological* evidence for Analysis A'; the presence of the nominative Case and *koto*$_{op}$ on the *koto-ga* phrase in *koto-ga* RTOs provides evidence that the logical embedded subject in RTOs undergoes Agree twice,

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[16] Note that the current claim that the analysis of *koto-ga* RTOs supports Analysis A (13a) and Analysis A' (14) does not exclude the possibility of Analysis B (13b) for standard RTOs.

with the embedded T as well as the matrix *v*.

5. Conclusion

This paper has explored a novel construction in Japanese, *koto-ga* RTOs, with the aim to shed new light on the issue of the proper analysis of Japanese RTOs. More specifically, this paper has argued that the *koto-ga* phrase of *koto-ga* RTOs originates in its theta position in the complement clause and that it undergoes two instances of Agree, one with the embedded T and the other with the matrix *v*. Given that *koto-ga* RTOs count as a variant of RTOs, this proposal lends support to the analysis of Japanese RTOs under which the accusative phrase originates in its theta position and moves to the Spec,CP of the complement clause, with optional movement into the matrix clause, and with the accusative phrase undergoing Agree twice (see (13a) and (14)).

Acknowledgements

Abbreviations

3	third person	NOM	nominative
ACC	accusative	PASS	passive
C	complementizer	PAST	past
COP	copula	PRES	present
DAT	dative	PROG	progressive
GEN	genitive	TOP	topic particle
NML	nominalizer		

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Loanword phonology in Trio
Patterns in phonotactic adaptations

Iris Marijke Koelewijn

In this paper, I provide a first look at the phonology of loanwords in Trio, a Cariban language spoken in Suriname and Brazil. Because of Trio's restrictive phonotactics, many loanwords are adapted through vowel epenthesis and consonant deletion. Using data from Meira (1999), Meira & Muysken (2017) and Carlin (2017), I compiled a corpus of 114 loanwords in Trio, from various source languages such as Dutch, Portuguese and Sranan. Analysis of this corpus shows that different strategies for vowel epenthesis are used systematically, and that there is a surprisingly high rate of consonant deletion which is as of yet unexplained.

1. Introduction

When words from one language are borrowed into another, their form often changes to fit into the phonological system of the borrowing language. Such changes can be both segmental and suprasegmental. This paper investigates suprasegmental loanword adaptations in Trio (also known as Tiriyó), a Cariban language spoken in Suriname and Brazil. Potential patterns in phonotactic adaptation strategies in Trio are identified and compared to Uffmann's (2007) typology of vowel epenthesis.

Like many Amerindian languages, Trio has had a long and varied history of language contact. Traces of pre-colonial contacts between Cariban languages like Trio and Arawakan languages can be seen in flora and fauna terminology (Carlin 2017); the borrowings of Tupian origins listed by Meira & Muysken (2017) are likely to be from the same period. In the early 16th century, some loans from Spanish spread across the area north of the Amazon river, such as Trio /aɽakapusa/ 'firearm' from Spanish *arcabuz* (/arkabus/) (Carlin 2017:232; Meira 1999:604). From the late 18th century, there were regular commercial relations between the Trio people and the Ndyuka, a group of enslaved people who escaped from plantations on the Surinamese coast and fled inland. This contact led to the formation of a pidgin language which was used until the late 20th century (Carlin 2004; Meira & Muysken 2017).

Starting around the 1950s, various missionaries (Portuguese, American, and Dutch) visited the Trio villages, and both on the Brazilian and on the Surinamese side sustained contact with the state (i.e. with Brazil and Suriname, which was a Dutch colony until 1975) was established when airstrips were built in some villages (Meira 1999; Carlin 2004). The period from the 1950s until the present day is characterized by intensive contact with Brazilian Portuguese, Dutch,

Sranan (a creole language spoken as a lingua franca in Suriname) and to some extent English. Contact with Western societies brought many new concepts for which terms were often borrowed from these languages, such as temporal specifications, objects like flashlights and radios, and more recently modern communication technologies (Carlin 2017).

Trio therefore has loanwords from various different languages, and this makes it an interesting case for the study of loanword adaptation: much previous work on phonological loanword adaptation has focused on languages borrowing from English (see e.g. Uffmann 2007 and studies cited therein). Additionally, Trio has a relatively small phonemic inventory and restrictive phonotactic rules, which will be described in section 2.1 below; this means it is often necessary to adapt the forms of loanwords to make them conform to Trio phonology. However, loanword adaptation in Trio has not been previously discussed from a phonological perspective: prior work such as that by Carlin (2017) has focused on sociolinguistic and semantic aspects of borrowing.

The aim of the present paper is thus to describe the phonological adaptation of loanwords in Trio; specifically, I will focus on adaptations motivated by syllable structure constraints (i.e. vowel epenthesis and consonant deletion), and discuss how the patterns of vowel epenthesis and consonant deletion in Trio relate to previous work by Uffmann (2007). To this end, I will analyze a corpus of 114 loanwords collected from lists in Meira (1999), Carlin (2017), and Meira & Muysken (2017).

The next section will provide some necessary preliminaries on Trio phonology, along with relevant background on phonotactic loanword adaptation and Uffmann's (2007) work on vowel epenthesis. Section 3 will discuss the methodology of the current study, including the data and its limitations. Section 4 will provide a systematic analysis of vowel epenthesis and consonant deletion in Trio. Finally, section 5 will discuss which generalizations we can make about phonotactic loanword adaptations in Trio and how these relate to the conclusions of Uffmann (2007), and provide suggestions for future research. The Appendix contains the full list of loanword data that this paper is based on.

2. Background
2.1. Trio phonology

Table 1 and Table 2 show, respectively, the vowel phonemes and consonant phonemes in Trio.

	Front	Central	Back
Close	i	ɨ	u
Mid	ɛ	ə	ɔ
Open		a	

Table 1: Vowel phonemes in Trio, adapted from Carlin (2004:50) and Meira (1999:30)

	Labial	Alveolar	Palatal	Velar	Glottal
Plosive	p	t		k	
Fricative	(ɸ)	s			h
Flap/liquid		ɾ			
Nasal	m	n			
Glide	w		j		

Table 2: Consonant phonemes in Trio, adapted from Carlin (2004:45) and Meira (1999:30)

It is notable that there is no voice distinction for consonants in Trio, and there are no labial fricatives (aside from /ɸ/ which is only marginally phonemic; Meira (1999) considers it merely an allophone of /p/). The consonantal phonemic inventory of Trio is considerably smaller than those of Dutch, Sranan and Portuguese, the most frequent sources of loanwords in Trio; this predictably leads to many segmental adaptations. However, as section 3 will show, currently available data on loanwords in Trio is not well-suited to studying these segmental adaptations.

Syllable structure in Trio can be represented as (C)V(V)(C) (Meira 1999:29). Some restrictions apply, listed in (1).

(1) a. Onsetless syllables only occur word-initially;
     b. Only nasals and /h/ can be syllable codas;
     c. /h/ cannot be word-final;
     d. /ɨ/ does not occur word-initially;
     e. Word-final syllables cannot contain a long vowel;
     f. The first vowel in a diphthong can be any except /i/;
     g. The second vowel in a diphthong can be any except /a/, / ɨ/ or /ə/.   (Meira 1999:41)

Due to the restriction on syllable-final consonants, the only possible consonant clusters in Trio are word-internal, heterosyllabic, and always of the form /N.C/ (where N stands for a nasal, which assimilates in place of articulation to the following consonant) or /h.C/ (Meira 1999:42). As will be shown in the remainder of this paper, loanwords often need to be adapted to avoid inadmissible consonant clusters as well as word-final consonants in Trio.

2.2. Phonotactic adaptations and Uffman's typology of vowel epenthesis

In principle, there are two ways to deal with a consonant cluster or coda consonant that violates the syllable structure constraints of a borrowing language: delete one of the consonants, or insert an epenthetic vowel into the sequence of consonants. Cross-linguistically, vowel epenthesis appears to be a much more common strategy than consonant deletion, with various quantitative analyses finding deletion rates around 3% (Uffmann 2007:3). This trend was formalized by Paradis & Lacharité (1997) as the Preservation Principle, which holds that segmental information is preserved as much as possible. Notably, Uffmann (2007) writes that consonant

deletion may be preferred in some languages, such as White Hmong, where it is motivated by size restrictions on the phonological word. In Trio, there are no such restrictions (Meira 1999; Carlin 2004).

We can thus identify vowel epenthesis as the generally preferred strategy to make loanwords conform to the borrowing language's phonotactics; however, the question then remains *which* vowel is inserted. Three general strategies to determine the quality of the epenthetic vowel have been identified in previous work.

(2) a. Default epenthesis: the same 'default' vowel is inserted regardless of the context;
     b. Vowel copy or harmony: the epenthetic vowel has all or some of the same features as an adjacent underlying vowel;
     c. Consonantal assimilation: the epenthetic vowel agrees in place of articulation with an adjacent consonant.   (Uffmann 2007)

Uffmann (2007) presents statistical analyses of vowel epenthesis in Shona, Sranan, Kinyarwanda, and Samoan, which show that each of the four languages displays all three strategies to determine the quality of the epenthetic vowel, be it in different environments. For example, Uffmann finds that in Shona consonantal assimilation is the dominant strategy, vowel harmony is found in one specific context (across obstruents if the preceding vowel is high), and in some instances /i/ is inserted as a default epenthetic vowel (Uffmann 2007:78).

3. Data and method
3.1. The loanword data

A corpus of loanwords in Trio was compiled based on three sources: Meira's (1999) grammar of Trio which contains a list of 49 loanwords; Carlin's (2017) analysis of language contact in Trio and Wayana which contains 62 loanwords in Trio; and Meira & Muysken's (2017) description of Trio-Ndyuka pidgin, which includes a list of Tupian borrowings in Cariban languages that contains 14 'plausible' loanwords in Trio (based on Meira & Muysken's judgements of similarities between the Tupian and Trio words). After removing duplicates, we are left with a list of 114 loanwords, given in the Appendix.

3.2. Method

The Trio loanwords were compared to their source forms to identify cases of phonotactic adaptations, i.e. vowel epenthesis and consonant deletion. Adaptations were counted conservatively; for example, a number of possible consonant deletions were excluded because the source form was a Dutch word ending in /ən/. /n/ is commonly deleted in this context in Dutch, and we cannot draw conclusions based on the missing /n/ in e.g. */ɔɔsətə/* 'east' from Dutch *oosten (/oːstə(n)/)* (Carlin 2017:243) when this /n/ may not even have been present in the Dutch input that Trio speakers received. Additionally, while Sranan allows some consonant clusters, it does not allow consonants in word-final position. Therefore, Trio words that seem to be borrowed directly from Dutch but were actually borrowed from Sranan may have already 'lost' a coda consonant in the adaptation from Dutch to Sranan. For example, */fɾɛdi/* 'Friday',

for which Meira (1999:605) posits Dutch *vrijdag* (*/vrɛi̯dax/*) as a source, could also originate from Sranan *freyda* (*/frɛi̯da/*), in which case there is no consonant deletion (that is, the coda consonant was already deleted in the adaptation of the word from Dutch to Sranan).[1] Such cases were not counted.

Keeping the above considerations in mind, 31 cases of vowel epenthesis and 17 cases of consonant deletion were identified in the loanword corpus. A single loanword may contain multiple epenthetic vowels, such as in the previously noted example */aɽakapusa/* 'firearm' from Spanish *arcabuz* (*/aɾkabus/*) (Carlin 2017:232; Meira 1999:604), which is thus counted twice. There are also examples of words with an epenthetic vowel as well as a deleted consonant, like */akətɔpə/* 'October' from Dutch *oktober (/ɔktoːbər/)*, and words in which two consonants were deleted, like */sɛpɛnpə/* 'September' from Dutch *september (/sɛptɛmbər/)* (Carlin 2017:239).

For each of these phonotactic adaptations, the location within the word (onset cluster, word-internal cluster, or word-final) and the phonological environment were noted. For the cases of vowel epenthesis, the quality of the inserted vowel was also noted. This data was then compared to identify possible regularities, keeping in mind Uffmann's (2007) typology of vowel epenthesis strategies. The statistical classification analyses used by Uffmann are not used here, since this would be unrealistic with so small a corpus (for comparison, Uffmann's Shona loanword corpus contains 1711 examples of vowel epenthesis).

3.3. Quality of the loanword data

It is important to note the limitations of this data. First, all of the sources for the corpus give only orthographic representations; IPA transcriptions were added by myself. Thankfully, Trio orthography is fairly transparent, but phonetic detail is still lost, which makes it difficult to analyze segmental adaptations. For example, Dutch and Sranan /r/, /l/, and sometimes /d/ all seem to be adapted as /ɽ/, but it is impossible to tell whether the realization of /ɽ/ differs depending on the source material. Additionally, both Meira (1999) and Carlin (2017) sometimes give Trio forms containing letters not used in standard Trio orthography, e.g. *f* and *d* in the word *fredi* from Meira (1999:605) and *c* in the word *project* from Carlin (2017:245).

Furthermore, the fundamental content of the present paper involves comparing Trio forms of loanwords to their source forms; however, in many cases the source form is uncertain, and sometimes even the Trio form is uncertain. Consider for example the Trio word meaning 'school'. It is given as *sikora (/sikɔɽa/)* by Meira (1999:604) and as *sikoro (/sikɔɽɔ/)* by Carlin (2017:245). Meira states that the source form is Portuguese *escola (/iskɔlɐ/)* or Dutch *school (/sxoːl/)*; according to Carlin it is from Dutch or Sranan (the Sranan word is *skoro (/skoro/)*). Even English *school (/skuːl/)* is a plausible source, since some of the first missionaries to visit the Trio villages were Americans. In this case, we are thus sure of neither the Trio form nor the source form of the word.[2] However, we can still identify the presence of an epenthetic /i/ which

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[1] In fact, *fredi* is a puzzling form to begin with. Both *f* and *d* are not used in standard Trio orthography, and the */fɽ/* cluster is not permitted by Trio phonotactics. Carlin (2017:238) gives this word as *pereiri*, which seems more plausible.

[2] I do not mean to presume that only one of the Trio forms and only one of the source forms can be 'correct'. In fact, it is entirely plausible that Carlin, who gathered her data primarily in Suriname, found a different Trio form than Meira, who spent more time on the Brazilian side of the border. Furthermore, multiple of these suspected source forms could have influenced the Trio word.

is inserted into the onset cluster, since this cluster is present in all four possible source forms (as /sk/ in Portuguese, Sranan, and English, and as /sx/ in Dutch), and the /i/ is present in both possible Trio forms. If we assume a Dutch or English source form, the word-final vowel would also be epenthetic, but we cannot be sufficiently certain of this. Therefore, this vowel is not counted in the analysis.

While most data points are not this problematic, there are many other examples where the source of a loanword may be either Sranan or Dutch (in many of these cases, the Sranan word was itself borrowed from Dutch). As noted above, this distinction is often relevant when counting adaptations. A Sranan pocket dictionary (Ietswaart & Haabo 2012) was therefore used to check for possible Sranan source forms when my references only mentioned a Dutch source.

4. Analysis

This section will present the patterns that can be identified in suprasegmental adaptations in the Trio loanword corpus, starting with vowel epenthesis (4.1), then describing consonant deletion (4.2), and finally a brief discussion of unexpected suprasegmental adaptations and non-adaptations (4.3).

4.1. Vowel epenthesis

Table 3 shows the frequencies of different epenthetic vowels in the Trio loanword corpus. We see that all 7 vowels appear at least once. While /i/ and /ə/ are found more frequently than the other vowels, a clear pattern does not immediately emerge.

Vowel	Frequency
/a/	5
/ɛ/	4
/i/	9
/ɔ/	2
/u/	2
/ə/	8
/ɨ/	1

Table 3: Frequencies of epenthetic vowels (N = 31) in the Trio loanword corpus

4.1.1. Vowel copy

Going back to Uffmann's (2007) vowel epenthesis strategies, listed in (2), we can find some cases of possible vowel copy in the corpus, as shown in examples (3) through (5), where the relevant epenthetic vowel is bolded.

(3) /a.pɛ.ɾ**i**.si.na/ 'orange'   < Dutch /ɑ.pəl.sin/   (Meira 1999:604)

(4) /san.pɛ.ɾɛ.ɾu/ 'hat'   < Spanish /som.bre.ro/   (Meira 1999:604)

(5)   /sɔ.ɽɔ.tə/ 'key'   <   Dutch /slø:.təl/   (Meira 1999:604)

In each of these examples, an epenthetic vowel is inserted to break up a word-internal or word-initial consonant cluster, and the quality of the vowel is identical to the following vowel. There are also examples of vowel copy in word-final epenthetic vowels, as in (6), where the epenthetic vowel is identical to the preceding vowel.

(6)   /nu.mu.ɽu/ 'phone number'   < Dutch /nʏ.mər/   (Carlin 2017:252)

When the neighboring vowel is a diphthong, the epenthetic vowel can have the quality of the closest vowel part in the diphthong, as in (7) and (8). The same pattern can be identified in the final epenthetic vowel of the word */tɨreisi/* 'three' (example 14); however, there are also examples that do not show vowel copy from a diphthong (16 and 17).

(7)   /pɛ.ɽɛi.ɽi/ 'Friday'   <   Sranan /frɛi̯.da/   (Carlin 2017:238)

(8)   /tɔi.si/ 'two'   <   Portuguese /dojs/   (Meira 1999:605)

In total, 11 out of 32 epenthetic vowels in the corpus could be explained by vowel copy. It is notable that in example (3) through (8), the consonant that intervenes between the epenthetic vowel and its identical neighbour is always /ɽ/ or /s/. In fact, this holds for 10 out of 11 vowel copy tokens.[3] However, there are also a few examples where /ɽ/ or /s/ is the intervening consonant and yet there is no vowel copy, as in (9) and (10).

(9)   /sa.tə.ɽi/ 'Saturday'   <   Sranan /sa.tra/   (Carlin 2017:238)

(10) /a.ɽa.ka.pu.sa/ 'firearm'   < Spanish /aɾ.ka.bus/   (Carlin 2017:232)

4.1.2. Consonantal assimilation

For some of the remaining examples of vowel epenthesis in the loanword corpus, the quality of the vowel can be explained by consonantal assimilation. Two patterns of consonantal assimilation can be found in the data: /i/ after /s/, and /ə/ and /ɨ/ after /t/.
    Example (11) and (12) show the insertion of /i/ after /s/ in onset clusters. This can be considered consonantal assimilation because the close front vowel has similar features to the alveolar fricative. Note the contrast with example (5), where /ɔ/ is found after /s/ instead; this can be explained by vowel copy being possible across /ɽ/ but not across plosives like /k/ and /t/.

(11) /si.kɔu.tu/ 'police'   <   Sranan /sko:.tu/   (Carlin 2017:245)

(12) /si.tɛn/ 'vote'   <   Sranan /sten/   (Carlin 2017:245)

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[3] The remaining case of possible vowel copy is */ɔɔsətə/* 'east' from Dutch *oosten* (Carlin 2017:243). It is possible that the identity of the epenthetic vowel with the following vowel is a coincidence, since it is the only case of vowel copy across a plosive – see section 4.1.3 for the alternative explanation.

Example (13) and (14) show the insertion of /ɨ/ and /ə/ after /t/. Since /t/ typically has an alveopalatal place of articulation in Trio (Carlin 2004:46), the insertion of a central vowel can be explained by consonantal assimilation. Note that this pattern would also explain the insertion of /ə/ in example (9), a case where we would expect /i/ on the basis of vowel copy.[4]

(13) /tə.ɽi/ 'three'   < Dutch /dri/   (Meira 1999:605)

(14) /tɨ.ɽei.si/ 'three'   < Portuguese /trejs/   (Meira 1999:605)

4.1.3. Default epenthesis

After accounting for the above patterns of vowel copy and consonantal assimilation, 11 cases of vowel epenthesis in the corpus remain unexplained. Table 4 gives the distribution of vowel quality among these cases.

Vowel	Frequency
/a/	3
/ɛ/	2
/u/	1
/ə/	5

Table 4: Frequencies of epenthetic vowels not explained by vowel copy or consonantal assimiliation (N = 11)

The only vowel epenthesis strategy that remains, out of Uffmann's (2007) typology in (2), is default epenthesis. However, it is not straightforward to attribute our remaining examples to default epenthesis: how can we have four different default vowels? My proposal is that the remaining cases of epenthetic /a/ and /ə/ can in fact be motivated by default epenthesis, based on their higher frequency. The presence of two different epenthetic vowels could be the result of diachronic change. Other explanations must then be sought for the as of yet unexplained cases of /ɛ/ and /u/.

The three loanwords with an epenthetic /a/ that cannot be explained by vowel copy are */apeɽisina/* 'orange' from Dutch *appelsien (/apəlsin/)*, */aɽakapusa/* 'firearm' from Spanish *arcabuz (/arkabus/)*, and */panpiɽa/* 'paper, book' from Dutch *pampier (/pampi:r/)* (Meira 1999:604).[5] We already saw in the introduction that */aɽakapusa/* was one of the earliest known loanwords in Trio. The other two examples are both based on archaic Dutch terms, and can thus also be assumed to be borrowed long ago. In contrast, the remaining cases of epenthetic /ə/ appear to be more modern borrowings: they are found in numerals,[6] months of the year, and in

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[4] This could lead us to suspect that consonantal assimilation is prioritized over vowel copy, in environments where both are possible. However, this is contradicted by example (5), */sɔɽɔtɔ/*, where we should see */siɽɔtɔ/* if consonantal assimilation is indeed preferred.

[5] The common Dutch word for 'paper' is *papier*. However, *pampier* is an informal, archaic synonym (den Boon & Hendrickx 2015; De Coster 2020).

[6] See Carlin (2017:236) for a reasoning as to why numerals can be assumed to be relatively new borrowings: she links the use of Dutch numerals to monetary economy, which did not spread to Trio culture until the 1990s.

the word /konpəjutə/ 'computer'. Therefore, I suggest that the default epenthetic vowel in Trio used to be /a/, but is now /ə/.[7]

Three unexplained examples of vowel epenthesis then remain, given in (15) through (17). It is possible that (17) is another case of consonantal assimilation: perhaps the rounded vowel /u/ is inserted because of the adjacent bilabial glide; however, we must be cautious in assuming this pattern since there are no other examples in the data.

(15)   /sɔ.ɽɔ.pɛ/ 'shovel'   < Dutch /sxɔp/   (Meira 1999:604)

(16)   /ɛi.pɛ.ɽəu/ 'April'   < Dutch /ɑ.prɪl/   (Carlin 2017:239)

(17)   /**tu**.wɛi/ 'two'   < Dutch /tʊe:/   (Carlin 2017:236)

4.2. Consonant deletion

It is remarkable that out of 48 suprasegmental adaptations in the Trio loanword corpus, we find 17 cases of consonant deletion. These cases merit a closer look, since they are much more numerous than is predicted by the literature, especially considering that there is no maximality restriction on word length in Trio.

In 10 out of the 17 cases, a word-final consonant is deleted, which is almost always a liquid: /r/ or /l/ (there is one deletion of word-final /s/). It is possible that these deletions are motivated by low perceptual saliency, especially since the nucleus of the affected syllable is often /ə/, as in example (18).

(18)   /nɔ.pɛn.pə/ 'November'   < Dutch /no.vɛm.bər/   (Carlin 2017:239)

The remaining 7 cases concern consonant clusters, but never word-initial consonant clusters; it seems that onset clusters must be resolved by epenthesis (see examples 5, 7, 11, 12, 13, and 17). In two of these cases, example (19) and (20), /ʁ/ is deleted, which may again be related to low perceptual saliency. Example (21) and (22) both contain a /jɾ/ cluster which becomes /ɽ/ in Trio (note that Trio does have the glide /j/, but it cannot be in syllable-final position).

(19)   /ma.tɔ/ 'hammer'   < French /maʁ.to/   (Meira 1999:604)

(20)   /tɛɛ.sa/ 'Tuesday'   < Portuguese /teʁ.sɐ/   (Meira 1999:605)

(21)   /sa.nɛ.rɔ/ 'January'   < Portuguese /ʒɐ.nej.ɾu/   (Meira 1999:605)

(22)   /fɛ.wɛ.ɽɛ.ɽu/ 'February'   < Portuguese /fe.ve.ɾej.ɾu/   (Meira 1999:605)

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[7] The case of /ɔɔsətə/ 'east' from Dutch *oosten* (Carlin 2017:243), which was previously mentioned in the section on vowel copy, may also be better explained by default epenthesis: the reasoning is then that vowels cannot be copied across plosives like /t/, and so a default epenthetic /ə/ is inserted, which is coincidentally identical to the following vowel. Note that for a word-internal epenthetic vowel, we only see vowel copy from the following vowel and not the preceding vowel in Trio (see 4.1.1), which explains why the form is not /ɔɔsətə/.

4.3. Unexpected suprasegmental adaptations and non-adaptations

This section will consider two remaining issues: vowel epenthesis that is not strictly required by phonotactic constraints, and loanwords with remaining violations of Trio phonotactics.

4.3.1. 'Unnecessary' vowel epenthesis

Example (3), repeated in (23), contains not only an epenthetic /i/ which we explained earlier as a case of vowel copy, but also a word-final epenthetic /a/. The insertion of this /a/ is puzzling, since it is not required to make the word conform to Trio phonotactics: /n/ is a perfectly acceptable syllable coda, as was noted in section 2.1.[8]

(23) /apeɽisin**a**/ 'orange'   < Dutch /ɑpəlˈsin/   (Meira 1999:604)

Why would the seemingly superfluous epenthetic /a/ be added? A possible explanation can be found in stress assignment.[9] The Dutch source form has stress on the final syllable. In Trio, words consisting of only light, i.e. (C)V, syllables receive stress on every second syllable from the left, but the last syllable is never stressed (Meira 1999; Carlin 2004). Without the epenthetic /a/, we would thus expect stress to be assigned as follows: */a.ˈpɛ.ɽi.sin/.* The insertion of an additional epenthetic vowel results in */a.ˈpɛ.ɽi.ˈsi.na/* (there is no distinction between primary and secondary stress in Trio), which corresponds better to the stress of the source form.

4.3.2. Non-adaptations

Both Meira (1999) and Carlin (2017) list a number of loanwords with Trio forms that violate phonotactic constraints, and occasionally appear to contain non-native phonemes (although this is difficult to judge from orthographic representations only). Some examples are given in (24) through (26).

(24) /sɛs/ 'six'   < Dutch /zɛs/   (Carlin 2017:236)

(25) /fɽɛdi/ 'Friday'   < Sranan /frɛi̯da/[10]   (Meira 1999:604)

(26) /wɛstɛ/ 'west'   < Dutch /ʋɛs.tə(n)/   (Carlin 2017:243)

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[8] A second, similar case of 'unnecessary' suprasegmental adaptation after a word-final /n/ was found in the data in Meira (1999), given by him as *karama(no)* 'chief' from Sranan *granman*. */kaɽama/* involves a consonant deletion, */kaɽamanɔ/* an epenthetic vowel, but again, there was no phonotactic violation that needed to be repaired in the first place. I checked with a (non-native) speaker of Trio, who could not confirm Meira's data; he only knew the word as */kaɽaman/*. I decided to consider only this form in my loanword corpus, and therefore counted neither a consonant deletion nor an epenthetic vowel for the end of the word.

[9] Note that data on stress is not available for the Trio loanword corpus; the following analysis is based on the *expected* stress assignment that follows from Trio phonology.

[10] As noted in section 3, Meira (1999:604) suggests a Dutch source, *vrijdag (/vrɛi̯dax/),* but it is likely that the word was borrowed via Sranan.

The unadapted /s/-coda in (24) and (26) suggests that perhaps /s/ is becoming marginally acceptable as a syllable coda in Trio. However, example (26) remains puzzling, considering that on the same page, Carlin lists the Trio form */ɔɔsətə/* 'east' from Dutch *oosten (/oːstə(n)/)*. One would expect the /st/ cluster to be handled similarly in both words, but instead, it is resolved by an epenthetic vowel in one and left as-is in the other. This inconsistency can hardly be explained by geographic or diachronic variation, since Carlin likely collected both examples in the same place and time, and it seems logical that the words for 'west' and 'east' would also be borrowed at the same time. It is possible that the long vowel in *oosten* motivates epenthesis despite the potential acceptability of the /s/-coda;[11] unfortunately, there are no similar examples in the data which could confirm this hypothesis.

5. Discussion

This first analysis of phonological loanword adaptation in Trio has shown that certain patterns can be found in phonotactic adaptations. Several different strategies for vowel epenthesis can be identified in the loanword data from Meira (1999), Carlin (2017), and Meira & Muysken (2017). Vowel copy is found across the consonants /ɽ/ and /s/. Additionally, two patterns of consonantal assimilation are present: /i/ appears after /s/ and the central vowels /ə/ and /ɨ/ appear after /t/. However, in environments where both vowel copy and consonantal assimilation are possible, one is not consistently prioritized over the other. Finally, I propose that most remaining cases can be explained by default epenthesis: in older loanwords, /a/ acted as a default epenthetic vowel, while /ə/ is the default epenthetic vowel in modern borrowings.

Although the present analysis is based on a smaller amount of data than the work of Uffmann (2007), the conclusions are similar: all three main epenthesis strategies are attested in the Trio loanword data, and as described above, the pattern of epenthesis is complex but appears systematic, even if some questions remain. Interestingly, Uffmann demonstrates that the default epenthetic vowel in Sranan changed over time from /e/ to /i/, showing that diachronic change can indeed play a role in the quality of the default epenthetic vowel; here, a similar change for Trio was proposed, from /a/ to /ə/, although there is less data to support it.

It is notable that the current findings suggest that consonant deletion is much more common in Trio than would be expected based on previous cross-linguistic estimates cited by Uffmann (2007): in the Trio loanword corpus, 17 out of 48 suprasegmental adaptations (35%) involved the deletion of a consonant rather than the insertion of a vowel. Consonant deletion was only found in syllable codas, not in onset clusters, and in the majority of cases /r/ or /l/ was deleted. It is possible that these deletions are motivated by low perceptual saliency, but there is not enough evidence available to confirm this.

Finally, one word in the Trio loanword corpus suggested that vowel epenthesis occurs not only to repair phonotactic violations, but also to match the assignment of stress to the source material.

To lend more confidence to the conclusions drawn in this paper, additional research is needed, ideally based on a larger number of loanwords. A clearer picture of the different phonotactic adaptation strategies would allow for the development of a model, using for instance the Optimality Theory framework, to account for the conditions in which each strategy is applied.

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[11] Vowel length is distinctive in Trio, although long vowels are rare (Carlin 2004:51).

A larger corpus could also be investigated with statistical classification analysis methods, such as the Chi-square Automatic Interaction Detection (CHAID) used by Uffmann (2007), to confirm the systematicity of vowel epenthesis strategies identified in this paper. Additionally, the collection of data with more phonetic detail would allow for a more thorough examination of the role of perceptual saliency in consonant deletion, as well as segmental adaptations.

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Appendix: Trio loanword corpus

Below, the complete list of Trio loanwords collected from Meira (1999), Carlin (2017), and Meira & Muysken (2017) is given. As was noted in section 3, all of these sources give only orthographic forms. I transcribed the Trio forms into IPA, except for the loanwords that are completely unadapted from their source form despite apparent violations of Trio segmental and suprasegmental phonology; these are marked with an asterisk in the table.

Trio form	Meaning	Most likely source form	Reference[12]
/ahkətə/	August	Dutch *augustus*	C 239
/akətopə/	October	Dutch *october*	C 239
/akusa/	needle	Spanish *aguja*	M 604; C 233
/apeɽisina/	orange	Dutch *appelsien*	M 604
/aɽahka/	bird species	Tupinambá *arakwã*	M&M 225
/aɽakapusa/	firearm	Spanish *arcabuz*	M 604; C 232
/aɽawɛ/	cockroach	Tupinambá *araBe*	M&M 225
/banku/	bank	Sranan *bangi*	C 245
bel *	call (on the phone)	Dutch *bel*	C 252
duizend *	thousand	Dutch *duizend*	C 236
/ɛin/	one	Dutch *één*	M 605; C 236
/ɛipeɽəu/	april	Dutch *april*	C 239
/ɛnsu/	angel	English *angel*	C 244
/fɛbuɽaɽi/	February	Dutch *februari*	M 605
/fɛwɛɽɛɽu/	February	Portuguese *fevereiro*	M 605
/fɽɛdi/	Friday	Sranan *freyda*	M 605
honderd *	hundred	Dutch *honderd*	C 236
/isiɽɛti/	razor	Portuguese *gilete*	M 604
/januaɽi/	January	Dutch *januari*	M 605
/januwaɽi/	January	Dutch *januari*	M 605
/juɽu/	hour	Sranan *yuru*	C 240
/juuni/	June	Dutch *juni*	C 239
/juuɽi/	July	Dutch *juli*	C 239
/juuɽu/	hour	Sranan *yuru*	M 604
/kama/	bed	Dutch *kamer* (?)	C 245
/kamisa/	cloth	Spanish *camisa*	M 604; C 233
/kapitɛin/	chief	Dutch *kapitein*	M 604
/kaɽama(nɔ)/	chief	Sranan *granman*	M 604
/kasihpaɽa/	machete	Nheengatu *kiseapára*	M&M 225
/kau/	cow	Sranan *kaw*	M 604
/kɔɛri/	stroll	Sranan *koyri*	M 604
/kɔiri/	stroll	Sranan *koiri*	C 245
/kɔmisi/	committee	Dutch *commissie*	C 245
/kɔnpəjutə/	computer	English *computer*	C 252
/kɔrɔpi/	mushroom species	Tupinambá *urupe*	M&M 225
/kɔutu/	gold	Sranan *gowtu*	C 244

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[12] To avoid clutter, the following abbreviations are used: M = Meira (1999), C = Carlin (2017), M&M = Meira & Muysken (2017).

Trio form	Meaning	Most likely source form	Reference[12]
/kutɛi/	glass container	French *bouteille*	M 604
/kuusi/	domestic pig	French *cochon*	M 604
/majadɛɽa/	cast net	Portuguese *malhadeira*	M 604
/mandi/	Monday	Sranan *munde*	M 604
/maɽakaja/	ocelot	Tupinambá *marakaja*	M&M 225
/maɽakana/	parrot species	Tupinambá *marakanã*	M&M 225
/maɽasija/	watermelon	Portuguese *melancia*	M 604
/masu/	March	Portuguese *março*[13]	C 239
/matɔ/	hammer	French *marteau*	M 604
/mɛi/	May	Dutch *mei*	C 239
/minut/	mobile phone credit	Dutch *minuut*	C 252
/mɔnɽi/	Monday	Sranan *munde*	C 238
/mɔnturu/	motor	(none given)	C 244
/nana/	pineapple	Tupinambá *nanã*	M&M 225
/nɔɔɽdɛ/	north	Dutch *noorden*	C 243
/nɔpɛnpə/	November	Dutch *november*	C 239
/numuɽu/	phone number	Dutch *nummer*	C 252
/ɔɔɽa/	hour	Portuguese *hora*	M 604
/ɔɔsətə/	east	Dutch *oosten*	C 243
/ɔɽansi/	Dutch	Dutch *hollands*	M 604
/ɔɽɔisi/	watch, clock	Dutch *horloge*	M 604; C 245
/ɔɽɔkɔ/	work	Sranan *wroko*	M 604; C 245
/ɔtɔ/	car	Dutch *auto*	M 604
/paasi/	chief helper	Sranan *basi*	M 604
/paatəɽəi/	flashlight	Dutch *batterij*	M 604
/paku/	fish species	Tupinambá *paku*	M&M 225
/panpiɽa/	paper	Dutch *pampier*	M 604; C 232
/paɽawa/	parrot species	Tupinambá *parawa*	M&M 225
/patɛɽai/	flashlight	Dutch *batterij*	C 244
/pɛhpuwaɽi/	February	Dutch *februari*	C 239
/pɛihpə/	five	Dutch *vijf*	C 236
/pɛɽɛiɽi/	Friday	Sranan *freyda*	C 238
/pinta/	peanut	Sranan *pinda*	M 604
/piɽə/	four	Dutch *vier*	C 236
/pɔɽɛɔɽɔkɔ/	Thursday	Sranan *fodewroko*	C 238
/pɔtɔ/	city, Paramaribo	Sranan *foto*	M 604; C 245
project *	project	Dutch *project*	C 245
/pukuita/	paddle	Nheengatu *apukuitá*	M 604; M&M 225
/ɽaaɽijɔn/	radio	Dutch/Portuguese *radio*	M 604
/ɽama/	torch	Sranan *lampu*	C 245
/ɽanti/	government	Sranan *lanti*	M 604; C 245
/ɽaɽiɔ/	radio	Dutch *radio*	C 245
/ɽatɽa/	doctor	Sranan *ratra*	C 245

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[13] Carlin (2017:238-239) states that all months are borrowed from Dutch; in this case *maart*. However, the reviewers pointed out that Portuguese *março* (/ˈmaɾ.su/) seems more likely as a source in this case, especially based on the fricative /s/.

Trio form	Meaning	Most likely source form	Reference[12]
/ɽemiki/	lime	Sranan *lemiki*	M 604
/ɽisɛnpə/	December	Dutch *december*	C 239
/sanɛɽɔ/	January	Portuguese *janeiro*	M 605
/sanpɛɽɛɽu/	hat	Spanish *sombrero*	M 604; C 233
/satəri/	Saturday	Sranan *satra*	C 238
segunda *	Monday	Portuguese *segunda*	M 605
/sɛihpə/	seven	Dutch *zeven*	C 236
/sɛpɛnpə/	September	Dutch *september*	C 239
/sɛs/	six	Dutch *zes*	C 236
/sikɔɽa/	school	Sranan *skoro*	M 604
/sikɔɽɔ/	school	Sranan *skoro*	C 245
/sikɔutu/	police	Sranan *skowtu*	C 245
/sitəhtən/	foundation	Dutch *stichting*	C 245
/sitɛn/	vote	Sranan *sten*	C 245
/sɔiɽə/	south	Dutch *zuiden*	C 243
/sɔnɽi/	Sunday	Sranan *sonde*	C 238
/sɔɽɔpɛ/	shovel	Dutch *schop*	M 604
/sɔɽɔtɔ/	key	Dutch *sleutel*	M 604
/sunpu/	lead (for shooting)	Portuguese *chumbo*	M 604
tafra *	table	Sranan *tafra*	C 245
/tɛɛsa/	Tuesday	Portuguese *terça*	M 605
/təɽi/	three	Dutch *drie*	M 605; C 236
/təɽiɽɛɔɽɔkɔ/	Wednesday	Sranan *dridewroko*	C 238
/tiɽɛisi/	three	Portuguese *três*	M 605
/tɔisi/	two	Portuguese *dois*	M 605
/tuɽɛɔɽɔkɔ/	Tuesday	Sranan *tudewroko*	C 238
/tuɽɛsi/	tourist	Sranan (form not given)	C 245
/tuwɛi/	two	Dutch *twee*	M 605; C 236
/un/	one	Portuguese *um*	M 605
/waaɽa/	heron species	Tupinambá *wara*	M&M 225
/wakapu/	tree species	Tupinambá *wakapu*	M&M 225
/waɽuma/	plant species	Tupinambá *warumã*	M&M 225
/wɛstɛ/	west	Dutch *westen*	C 243
/winkəɽi/	shop	Sranan *wenkri*, Dutch *winkel*	C 245
/wɨraapa/	bow	Tupinambá *urapar*	M&M 225

In-situ wh-interrogative in Camuno
Interpretation at the interfaces

Matteo Fiorini

The aim of this paper is twofold. On the one hand, it presents novel data from an understudied Romance variety that could help sketching a more precise typological picture of wh-structures in Northern Italian Dialects. On the other hand, it proposes an analysis in terms of interface requirements at PF to account for the distributional properties attested. The latter is claimed to be more economical than previous proposals put forward for related varieties with similar patterns.

1. Introduction

Camuno is an Eastern Lombard (Gallo-Romance) variety spoken in Vallecamonica, an Alpine Valley part of the Province of Brescia, in Northern Italy. The area stretches for around 100 km south-to-north, and it is characterized by the presence of numerous dialectal areas that exhibit micro-variation involving all modules of grammar. This paper offers a novel analysis to account for the clause-internal distribution of wh-phrases focusing on the southmost dialect spoken in Darfo and neighbouring villages. From now on, the term 'Camuno' will identify this dialect, which can differ significantly from dialects spoken in more isolated locations in the area.

In the non-specialized literature, the Romance varieties spoken in the Italian peninsula are often referred to as 'Italian Dialects.' The term is misleading since the linguistic landscape of Italy is made up of languages that developed independently from Latin (Loporcaro 2010, i.a.). Such a view had severe consequences for language preservation, given the general stigma surrounding 'dialects' (De Mauro 1979, i.a.). This situation of diglossia and social stigma greatly affected Northern Italian Dialects (NID) – varieties spoken above the isogloss 'La Spezia-Rimini' (Loporcaro 2010). In fact, they have developed grammatical systems with significant local variation and patterns of optionality within macro- and micro-dialectal areas, arguably as a consequence of language contact with Italian and its perceived major prestige, and as a mark of identity.[1]

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[1] Most of the data presented here have been collected by interviewing 3 native speakers of Camuno via online video-meeting on Zoom. To avoid priming effects or a 'controlled-use' of grammar, the informants have been asked to design a questionnaire to collect information from other speakers.

The paper is organized as follows: in section 2, I present the attested pattern of distribution of wh-phrases in Camuno; section 3 gives an overview of the previous literature to account for similar patterns in other NID; in section 4, I propose that wh-phrases in Camuno are better analysed as interpreted *in-situ* and that the attested word-order is a consequence of PF constraint motivated by information structure; Section 5 is a conclusion.

2. The pattern

The distributional pattern of wh-phrases in Camuno is characterized by optionality between: (i) clause-internal wh-phrases (1a); and (ii) fronted wh-phrases, generally in the form of semi-clefting with an overt complementizer (1b). Simple fronting is attested (1c), but more rarely than in other Lombard varieties. The results of the preliminary data collection suggest that the clause-internal distribution of wh-phrases represents the standard strategy for, at least, non-D-linked wh-phrases.[2]

(1) a. A=lɔ   ist   *kwando* kɛl   hʧet le   la   tɔ   fonna?
         have=CL.3SG.M   see.PRT when   that.SG.M   boy   there the.F your wife
     b. *Kwand* ɛ ke   l'   a   ist   kɛl   hʧet le   la   tɔ   fonna?
         when   is that CL.3SG.M   has see.PRT that.SG.M   boy   there the.F your wife
         'When did your wife see that boy?'
     c. *Ke*   laurà fe=t?
         what job   do=CL.2SG
         'What is your job?'

Clause-internal wh-phrases must appear right-adjacent, with some exceptions presented in section 4, to the lexical verb. This position does not necessarily coincide with the one occupied by the corresponding element in declarative structures, as visible in pairs (2a/b) and (3a/b):

(2) a. Hkri=el   *ki*   a la   pina?
         write=CL.3SG.M   who to the.F child
         'Who writes to the little girl?'
     b. *La mama* la   hkria   a la   pina.
         the.F mom   CL.3SG.F   writes   to the.F child
         'The mom writes to the little girl.'

(3) a. Maje=la   *kɛ* la   hɔ   hpuda?
         eat=CL.3SG.F   what the.F his   wife
         'What does his wife eat?'
     b. La   maja   *la karne* la   hɔ   hpuda.
         CL.3SG.F   eat.3SG the.F meat   the.F his   wife
         'His wife eats meat.'

Non-argumental wh-phrases exhibit the same distribution when appearing clause-internally (4):

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(4) a. L'   e=t   ʧapada *kwando*?
        CL.3SG have=CL.2SG take.PRT when
        'When did you get it?'
     b. E=l   nahit   *ndoe*   al   to   kusì?
        is=CL.3SG born.PRT   where   the.M your cousin
        'Where was your cousin born?'
     c. He   ciame=j   *kome* i   to   dʒenitur?
        REFL call=CL.3PL   how the.PL   your parents
        'What is your parents' name?'
     d. E=la   *de ki*   la   makina ke   te   guidet?
        is=CL.3SG.F   of who the.F car   that CL.2SG   drive
        'Whose car is the one you drive?'

If the constraint is violated, the sentence is ungrammatical (5):

(5) a. *Hkri=el   a la   pina   *ki*?
          write=CL.3SG.M to the.F child.F who
        'Who writes to the little girl?'
     b. *Kɛ   maje=la   la   hɔ   hpuda?
          what eat=CL.3SG.F the.F his   wife
        'What does his wife eat?'
     c. *Kwando ɛ=l   nahit   al   to   kusì?
          when   is=CL.3SG born.PRT the.M your cousin
        'When was your cousin born?'

3. Previous literature

Considering historical, geographical, and typological factors, a discussion of the properties of wh-phrases in Camuno cannot disregard the results of the important studies of neighbouring varieties. Indeed, interrogative structures in Northern Italian Dialects (NID) have received significant attention for their peculiar morphosyntactic properties. The entire group is characterized by optionality between fronted and clause-internal wh-phrases (Bonan 2017, 2019) similar to, albeit different from, the one attested in Camuno (6)-(8):[3]

(6) a. *Che* ha=tu   parecià?
        what have=CL.2SG prepare.PRT
     b. Tu=ha   parecià   *che?*
        CL.2SG=have prepare.PRT   what
        'What did you prepare?'   (Bellunese; Poletto & Pollock 2000:(2))

(7) a. *Chi* ga=tu   catà?
        who have=CL.2SG meet.PRT

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[3] Most NID do not show restrictions on the type of wh-phrases available to fronting with no complementizer and, in numerous dialects of Eastern Lombard, unlike Camuno, clefting is not necessary to front all wh-phrases.

b. Ga=tu   catà   *chi*?
   have=CL.2SG   meet.PRT   who
   'Who did you meet?'   (Trevigiano; Bonan 2019:(22))

(8) a. Fa=l   *kohɛ*?
       do=CL.3SG.M   what
    b. *Koha* fa=l?
       what do=CL.3SG.M
       'What does he do?'   (Colognese; Manzini & Savoia 2011:(28))

In this section, I summarize the three main lines of analysis that have been proposed to account for the distributional patterns in NID.

3.1. The remnant movement analysis

To the best of my knowledge, Munaro (1999, 2001) provides the first formal investigation of interrogative structures in NID by discussing data from Bellunese, a Venetan variety.[4] Munaro proposes a unified account for fronted and clause-internal wh-phrases distribution. According to this hypothesis, the wh-phrase always moves to [spec, CP] and the apparent *in-situ* pattern results from remnant movement (cf. Webelhuth 1992). The derivation consists of the movement of the wh-phrase to a left-peripheral position XP. The IP, without the wh-constituent, then moves to a higher position YP resulting in the visible ordering (9).

(9) *First step:*   [XP wh-constituent$_i$ X° [IP … t$_i$ …]]
     Second step: [YP [IP … t$_i$ …]$_j$ Y° [XP wh-constituent$_i$ X° t$_j$]]

Hulk & Pollock (2001) widen the analysis, introducing a discussion of the specific functional heads involved in the derivation: (i) a NewInformation-Phrase, hosting the moved wh-phrase; (ii) a Ground-Phrase, hosting the moved IP; and (iii) a Force-Phrase hosting the subject clitic, which attracts the inflected verb to be lexicalized. The latter creates the standard 'inversion' pattern, attested in many NID (see Poletto & Pollock 2000). The derivation for (10a) is developed as in (10b):

(10) a. À   lo   magnà *che*?
        has   CL.3SG.M   eat.PRT what
        'What did he eat?'   (Grumellese; adapted from Manzini & Savoia 2011:(2))
     b. *Wh-phrase moves to NIP:* [NIP che$_i$ [IP à magnà t$_i$]]
        remnant movement (IP): [GroundP[IP à magnà$_j$ t$_i$][NIP che [IP t$_j$ t$_i$]]]
        SCl insertion: [ForceP lo [[IP à magnà$_j$ t$_i$][NIP che [IP t$_j$ t$_i$]]]]
        Verb lexicalizes clitic: [ForceP à$_w$-lo [[IP t$_{w\ magnàj}$ t$_i$][NIPche [IP t$_j$ t$_i$]]]]

Empirical evidence favouring a remnant movement analysis comes from observing a crucial difference between clause-internal wh-phrases in East-Asian Languages traditionally analysed as *in-situ* (cf. Huang 1982; Cheng 1991. i.a.), and NID. In the latter, clause-internal wh-phrases are a root phenomenon. According to Poletto & Pollock (2000), the head V is

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[4] The presence of *in-situ* wh-phrases in NID, has been documented at least since Benincà & Vanelli (1982).

sufficient to identify the type of sentence, hence, the economy principle bans remnant movement in embedded contexts.

Evidence for a moved status of wh-phrases in Bellunese comes, according to Munaro (1999) and Poletto & Pollock (2015), from two properties: (i) wh-phrases show sensitivity to both strong (11a) and weak islands (11b); and (ii) wh-phrases must appear in a sentence-final position (12):

(11) a. *Te   piase=lo   [i   libri   che   parla   *de che*]?
          CL.2SG like=CL.3SG.M the.PL books   that speak   of what
          'What is *x*, such that *x* is a topic and you enjoy books about *x*?'
                                            (Bellunese; adapted from Munaro 1999:(74))
      b. ??No   te=te=ricorda   [andé che   von   comprà *che*]?
          NEG   CL.2SG=CL.2SG=remember where that have.1PL   buy.PRT what
          'What is *x*, such that we bought *x* and you don't remember where?'

(12) a. Al   ghe ha   dat   *al libro* a so fradel.
          CL.3SG.M   DAT have.3SG give.PRT the book to his brother
          'He gave the book to his brother.'
      b. *Ghe ha=lo   dat   *che* a so   fradel?
          DAT has=CL.3SG.M give.PRT what to his   brother
          'What did he give to his brother?'
      c. Ghe ha=lo   dat   *che*, a so   fradel?
          DAT has=CL.3SG.M give.PRT what, to his   brother
          'To his brother, what did he give?'
                                      (Bellunese; adapted from Poletto & Pollock 2015:(2))

In (12a), *al libro* 'the book' appears right adjacent to the verb: in its argumental position. In (12b), its interrogative counterpart shows that the same position is not available to the wh-pronoun. The sentence is ungrammatical unless an intonational break follows *che* 'what.' In other words, the dative PP must be de-accented, i.e., it is right-dislocated. In Munaro's (1999) terms, there is a sentence-finality requirement on wh-phrases in Bellunese. According to the remnant movement analysis proponents, the data in (11) and (12) show that wh-phrases in Bellunese are instances of fake *in-situ*-ness given that the wh-phrases, although appearing in clause-internal position, are derived from movement.

3.2. In-situ analysis

A second possible analysis of clause-internal wh-phrases in NID, specifically Lombard varieties, has been proposed by Manzini & Savoia (2005, 2011). According to their analysis, on the one hand, these wh-questions can be discussed as instances of real *in-situ*-ness. On the other hand, Manzini & Savoia (2011) specifically argue against a remnant movement analysis, which they consider 'at best unnecessary' (p. 81) to account for both their novel data and the ones from the Venetan varieties discussed in the previous section. According to the authors, the evidence presented by the proponents of a remnant movement analysis is 'reconstructed backward from the required movements, rather than motivated by genuinely independent needs' (p. 80). Moreover, the authors observe that the data from Bellunese

cannot be generalized to Lombard varieties in which wh-phrases are, in fact: (i) insensitive to islands (13); and (ii) attested in both root and embedded contexts (14):

(13) a. Dìg=ei   che gé egnìt   [[i   amìs   *de chi*]]?
          say=CL.3PL that is come.PRT the   friends of whom
          lit. 'Whose friends do they say that came?'
     b. Ta   pjah [[i lìber   ch' i   pàrla *de cohè*]]?
          CL.2SG like   the books that' CL.3SG speak of what
          'For which *x*, such as *x* is a topic, you like books about *x*?'
     c. L'   è ndàʧ   ivja [[hènha   haludà   *chi*]]?
          CL.3SG is go.PRT away   without greeting who
          'For which *x*, such as *x* is a person, you left without greeting *x*?'
                                                                          (Manzini & Savoia 2005:(157))

(14) a. Krèd=et   [che al   hàbe indàʧ   *indoé*]?
          Think=2SG   that CL.3SG.M has go.PRT where
          'Where do you think he went?'
     b. Domànde=ga   [*kòha* l'   a   fàʧ   (*kohè*)].
          ask.2SG=CL.3SG what   CL.3SG has do.PRT (what)
          'Ask him what he did.'   (Manzini & Savoia 2005:(155))

According to Manzini & Savoia's (2005, 2011), and Manzini's (2014) proposals, a scope construal at LF is responsible for the interpretation of wh-phrases in their external merge position, i.e., *in-situ*.

The *in-situ* analysis of clause-internal wh-phrases is standardly adopted in the literature regarding East-Asian languages (cf . Huang 1982):

(15) a. Ni   kanjian-le *shei*?   *Linear order at PF*
          you see-ASP   who
     b. [[shei]]$_i$ [ni   kanjian-le t$_i$]]   *Wh-movement at LF*
            who   you see-ASP   t
          'Who did you see?'   (Huang 1982:(159),(160))

Manzini & Savoia (2005) argue that if the observation regarding the Venetan varieties and Lombard varieties can be generalized to the entire groups, a unified account for the two patterns can be expressed as a matter of micro-parametrical difference.

3.3. Short-movement analysis

A third proposal that has been put forward by Bonan (2017, 2019, 2021) makes use of a low focus position to account for the pattern observed in Trevigiano, a Venetan variety. Such a position (identified here as WhP) has been proposed to host Italian post-verbal subjects (Belletti 2004). A number of scholars have proposed the existence of a vP-periphery or, at least, of a T-internal focus position (explicitly mentioned beginning with Jayaseelan 2001). Short-movement to such a position in interrogative is also attested in some South-Asian languages (Bonan 2021).

In Trevigiano, similarly to Camuno, the wh-phrase must surface right adjacent to the lexical verb. According to her analysis, 'they […] undergo systematic wh-movement from their unmarked declarative position to a position lower than the finite V' (Bonan 2019:59):

(16) a. Ghe ga=tu   dato   *a chi*$_i$ a   tecia   t$_i$?
        DAT have=CL.2SG give.PRT to whom   the.F saucepan t
     b. *Ghe ga=tu   dato   a   tecia   *a chi*?
        DAT have=CL.2SG give.PRT   the.F saucepan to whom
        'Who did you give the saucepan to?'   (Trevigiano; Bonan 2017:(28))

Bonan (2021), claims that the data summarized below provide evidence for an analysis in terms of movement of the wh-phrase.

First of all, the declarative word order for the DP in post-verbal position is different from the wh-DP in interrogative structures, suggesting that it moved from the its theta position:

(17) a. Ghe   go   dato   i   pomi$_{DO}$ *a ʤani*$_{IO}$
        CL.3SG.DAT   have.1SG   give.PRT   the.PL   apples   to John
        'I gave the apples to John.'
     b. Ghe   ga=tu   dato   *a ki*$_{IO}$ i   pomi$_{DO}$?
        CL.3SG.DAT   have=CL.2SG give.PRT to whom   the.PL   apples
        'To whom did you give the apples?'   (Trevigiano; Bonan 2021:(7),(9))

Moreover, all adverbs following the theta-assigned constituents are strictly ordered (18). This would be consistent with movement of the wh-phrase since there is no evidence for movement of the other elements in the sentence. Wh-phrases appear, in fact, adjacent to the verb independently by their argumental or adjunct status, while the rest of the clause is argued to remain the same (18):

(18) a. Go   maɲà   ɲɔki$_{DO}$ jɛri   sera$_{TIME}$ aa   sagra$_{PLACE}$
        have.1SG eat.PRT gnocchi yesterday   night   at.the.F festival
     b. ?Go   maɲà   ɲɔki$_{DO}$ aa   sagra$_{PLACE}$ jɛri   sera$_{TIME}$
        have.1SG eat.PRT gnocchi at.the.F festival   yesterday   night
     c. *Go   maɲà { jɛri   sera$_{TIME}$}{ aa   sagra$_{PLACE}$}ɲɔki$_{DO}$
        have.1SG eat.PRT yesterday   night   at.the.F festival   gnocchi
        'I ate gnocchi yesterday evening at the festival.'   (Trevigiano; Bonan 2021:(8))

In the next section, first, I apply the proposals listed above to Camuno, showing that they cannot accommodate the data introduced here. Secondly, I present evidence in favor of an alternative analysis of interface phenomena to account for *in-situ* interpretation and surface order.

4. Proposal for Camuno

In this and the following section, after showing that the strategies proposed for other NID cannot capture the pattern attested in Camuno, I offer an alternative line of analysis based on PF constraints. In particular, I argue that informationally relevant items must align with main

sentence stress. Consequently, the topicalized portion of the clause is dislocated via Focus Evacuation Movement.

4.1. Remnant movement

Before presenting the analysis, in this section, I apply the hypotheses summarized above to Camuno, focusing on the ones that consider wh-phrases as moved. The goal of such a discussion is to highlight the differences between Camuno and other NID that justify the proposal of an alternative account for the former.

As pointed out by Manzini & Savoia (2011), the observations presented by Munaro (1999) for Bellunese do not hold for the Lombard varieties they discuss (nor, according to them, for most Venetan dialects). The claim is true for Camuno, an Eastern Lombard dialect, as well. Importantly, several further stipulations would be needed if the remnant movement analysis is applied to Camuno data. I use example (2) repeated here as (19a), to show the derivation following a remnant movement analysis implemented as in (19b):[5]

(19) a. Hkri=el   *ki*   a   la   pina?
          write=CL.3SG.M   who to the.F child.F
          'Who writes to the little girl?'
      b. [XP *ki*$_i$ [X°][IP t$_i$ *hkriel a la pina*]]]
          [[YP *hkriel a la pina*$_j$][Y°][XP *ki*$_i$ [X°][IP t$_i$ t$_j$]]]]

According to this derivation, the wh-phrase moves to [Spec, XP], and the verb moves to the higher YP. The order is not the one attested, and the only way to derive the surface order of Camuno would be to assume a series of further unmotivated movements of part of the IP targeting higher positions. Such an assumption does not respect the core Economy Principle of the Minimalist Program (Chomsky 1995), and, from an empirical point of view, it cannot capture the pattern of Camuno presented here.

4.2. Short-movement

As mentioned above, the distributional pattern attested in Trevigiano is remarkably similar to the one characterizing Camuno. Apparently, a short-movement analysis can indeed accommodate the data, as shown in the 'simplified' derivations in (20):

(20) a. [TP ε *riat* [WhP *ki*]]   'Who arrived?'
      b. [TP a *majat* [WhP *kε*]]   'What did s/he eat?'
      c. [TP a *majat* [WhP *kwando*]] 'When did s/he eat?'
      d. [TP a *majat* [WhP *kome*]]   'How did s/he eat?'
      e. [TP a *majat* [WhP *ndoe*]]   'Where did s/he eat?'

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[5] As far as my knowledge goes, no previous account, including, importantly, Bonan's (2017, et seq.) provides examples in which the wh-phrase is the external argument. The choice has been mentioned, but not fully motivated, in Bonan (2017) who claims that the short-movement would not be visible in these structures and in Bonan (2021), she observes that Trevigiano can only form subject-wh-question via clefting. This is not valid for, at least, Eastern Lombard varieties in which both distributions are attested.

There are, however, several reasons to advocate for a derivation more economical to account for the data from Camuno. In particular, I argue that it is possible to dispense from a short-movement analysis considering that such an analysis would require to posit a number of unmotivated movements of the verb. There is no reason, in fact, for the participle to move to T in contexts like (20).

Possibly, the verb may move in the specifier of WhP to check a [wh] feature. This, however, is problematic in that it cannot account for those elements intervening between the verb and the wh-phrase. These properties of Camuno, described in the next section, can better be captured if wh-phrases are analysed as instances of *in-situ* wh-phrases (cf. Manzini & Savoia 2005, 2011). The surface word order results from feature of the interface with PF.

5. In-situ

There are many properties of wh-phrases in Camuno, and in some of the other Lombard varieties discussed by Manzini & Savoia (2005, 2011), that point to an analysis in terms of *in-situ* distribution.

5.1. Evidence of in-situ distribution

First of all, in Munaro's (1999) account, island-sensitivity is explicitly used as a diagnostic for movement. However, as pointed out in Pesetsky (1987), *in-situ* wh-phrases can show island effects, as it is the case of, e.g., adjunct-wh-phrases in Chinese, which exhibit island effects (cf. Huang 1982; Lasnik & Saito 1992, i.a.). Moreover, both Manzini & Savoia (2011) and Bonan (2017, 2019, 2021) use island-sensitivity as evidence to support their respective proposals, i.e., it might be the case that as long as the wh-phrase sits lower than TP, it will be insensitive to islands. This being said, for consistency with the previous literature, in (21a) I show that Camuno does not show island effects, in line with the data from Grumellese (21b):

(21) a. Dig=ei   ke   jɛ   gnìt   i   amih   *de ki*?
          say=CL.3PL that are   come.PRT the.PL friends of whom
          lit. 'Whose friends do they say that came?'   (Camuno)
      b. Dìg=ei   che   gé   egnìt   i   amìs   *de chi*?
          say=CL.3PL that are   come.PRT the.PL friends of whom
          lit. 'Whose friends do they say that came?'

(Grumellese; Manzini & Savoia 2005:(157))

A less controversial test for lack of fronting has been proposed by Pesetsky (1987), who shows that non-D-linked wh-phrases *in-situ* cannot be modified by intensifiers like English 'the hell,' while moved wh-phrases can. I refer to such a diagnostic as the 'aggressively non-D-link test.'

In (22a) the wh-phrase is in a clause internal position and cannot be modified by *diaol* 'the hell' while in (22b), the wh-phrase is in a cleft configuration (i.e., moved) and can, in fact, be modified by any appropriate intensifier.[6]

(22) a. *E=l   nahit   *ndoe   **diaol** al   to   kusì?
     is=CL.3SG born.PRT   where devil the.M your cousin
     'Where the hell was your cousin born?'
   b. *{Ndoɛ /ndoe **diaol** l'   ɛ}* ke   l'   ɛ nahit   al   to   kusì?
      where/where devil CL.3SG is that CL.3SG is born.PRT   the.M your cousin
      'Where the hell was your cousin born?'

Finally, the right-adjacency requirement between verb and wh-phrase cannot be considered the reflection of a structural one, given that several elements can surface between the lexical verb and the wh-phrase. The same characteristic is observed for Trevigiano by Bonan (2021), who argues that, whenever an element intervenes between the verb and the wh-phrase, the participle further moves to one of the Aspectual projections above *tuto* 'all' and *ben* 'well' identified for Italian by Cinque (1999). I consider such a movement unmotivated for Camuno.

In particular, an important difference between Venetan and Lombard varieties is that the former have a pre-verbal negation, while the latter a post-verbal one. The negative particle *mia*, also used as an intensifier, can only appear lower than the inflected verb but higher than the wh-phrase. Additional elements that can intervene are emphatic/discourse-oriented adverbs, and particles as (23) shows:[7]

(23) Al   beker l'   a   dat   *mia/ po/ amò* **ke** a   la   htʃɛta
     the.M butcher CL.3SG have.3SG give.PRT NEG po   again what to the.F girl
     gier   hera?
     yesterday evening
     'What is the x such as the butcher did not give x to the girl last night?'

I will show in section 4.3.2 that (23) can be straightforwardly accounted for, by proposing that the semantic and pragmatic nature of these elements prevent them from being dislocated.

5.2. Interpretation at the interfaces

The evidence summarized above points to an analysis in terms of *in-situ* interpretation of clause internal wh-phrases in Camuno, similar to the one proposed by Manzini & Savoia (2005, 2011). In the remainder of the paper, I discuss an account which can accommodate the evidence for the *in-situ* distribution. The proposal is organized around the crucial importance of the relation between information structure and PF for determining word order.

It is well established since early works by Chomsky (1971) and Jackendoff (1972) that both wh-phrases and foci are marked as the most relevant element in a structure. From an

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[6] Apparently, the test has the same result in Trevigiano, however, Bonan (2017:44) explicitly states that 'aggressively non-D-linked wh-words are not discussed here because their distribution is consistently canonical, i.e. they can only appear fronted.' Indeed, Pesetsky's (1987) account only rules out fronting.

[7] A reviewer pointed out that the translation for (23) does not include translation for *po* and *amò*; these are discourse particles untranslatable in English without a thorough investigation of their meanings, not in the scope of this paper. The crucial fact here is that these are highly pragmatically marked items.

informational point of view, they both represent the 'new information' in a sentence or 'the answer to an (implicit) wh-question' (see Büring 2016 for an overview). This intuition is motivated in an 'Alternative Semantics' approach, following the proposal put forward by Rooth (1985, et seq.). The proposal, in a nutshell, consists of the availability of two denotations for each proposition: (i) the ordinary semantic values; and (ii) the focus semantics values. A wh-phrase evokes the set of Focus Alternatives for a given proposition and, in the answer, the appropriate alternative is selected. This interaction can be exemplified in (24):

(24)   Q: What did John drink?
      A: John drank coffee.
      Focus Alternatives: {John drank coffee; John drank tea; John drank milk … }

Focus and wh-phrases share, cross-linguistically, several pragmatic, semantic, and syntactic properties. The relationship between focus and wh-structures in Camuno is very strict from the syntactic and prosodic point of view. In particular, in both cases, the main element attracts the main sentence stress, as discussed below.

In the mapping between syntactic structure and PF, constituents bearing a [foc] feature tend to align with the most prominent stress in the sentence (Selkirk 1984; Reinhart 2006). This directly influences a generalized tendency to have prosodic prominence to the more informationally relevant elements in a sentence (Büring 2016). From a syntactic point of view, Cinque (1993) observes that the constituent bearing main sentence stress is the one in the most embedded position in the structure.

I argue that the surface word-order observable in wh-questions results from a syntactic requirement motivated by phonological constraints. In particular, I advocate for an analysis in line with Arregi (2002) for Basque; Borise (2016) for Georgian; Samek-Lodovici (2016) for Italian. In their accounts, focalized items surface in the relevant position for that language as the result of Focus Evacuation Movements motivated by requirements of the Syntax-PF interface. In a nutshell, in these languages, whenever the focalized element is not the most embedded element of the sentence it cannot receive main sentence stress. As discussed above, the latter is a categorial property of foci in numerous languages. Consequently, in order for the main sentence stress to fall on the most embedded element in the sentence, the unfocalized material move to a different position in the clause so that the appropriate element can occupy the most embedded node in the structure.

In Camuno, the main sentence stress falls on the right edge of a phonological phrase that coincides with the intonational phrase in unmarked structures. The similarities between focus and wh-phrases observed above justify a proposal based on phonological constraints. The main sentence stress needs to align with the constituents carrying a [wh] feature. To avoid a wrong alignment, elements that are not informationally prominent but that would appear at the right edge of stress bearing phonological phrase σP move out of the predicate-phonological phrase. The latter correctly predicts that all non-informationally-prominent elements are unstressed, and that every non-wh argument must move out of vP. When dislocated, the de-accented material is still part of the intonational phrase, characterized by the obligatory interrogative prosodic-contour described as LH* by Lepschy (1978, cited in Giorgi 2017) for Italian. In (25), σP is the phonological phrase receiving main sentence stress which aligns with its right boundary, signalled by *#*. More specifically, the main sentence stress aligns with *kwando* 'when' in (25), it being the [wh]-marked constituent.

(25) [[A=l   majat   *KWANDO*]#$_{\sigma P}$ [la   polenta ala   ho   kà   al
       has=CL.3SG   eat.PRT   when   the.F polenta at.the.F his   house   the.M
       Piero?]]$_{IntP(LH^*)}$
       Piero
       'When did Piero eat polenta at his house?'

Following Samek-Lodovici (2016), I assume that the topicalized material moves to a node RD (Right-Dislocation), adjunct of TP and the wh-phrase is the most embedded element in the structure. The derivation is illustrated in Figure 1, in which σ represents informationally relevant material that resists evacuation. This definition concerns some of the elements introduced below: discourse particles, negative markers, and epistemic adverbs. A detailed discussion for such elements requires more data to be carried out, however, their highly pragmatic nature make their status as informationally-relevant items uncontroversial. The unmarked material identified in the tree by *δ*, is dislocated as an adjunct to TP. The internal structure of RD is irrelevant to the present analysis, but see Samek-Lodovici (2016) on the organization of the node. The derivation differs from Samek-Lodovici's in that no movement of the relevant material is needed before evacuation. In this respect, the proposed account resembles Arregi's (2002), in that σ needs to be in the most embedded position in the structure to receive main sentence stress. Finally, the movement of the auxiliary is the standard T-to-C movement resulting in the 'clitic-aux inversion' attested in Camuno and other Lombard varieties.
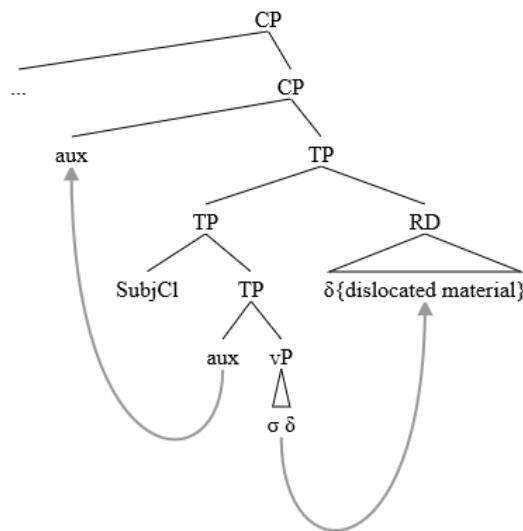
Figure 1

While an extensive study of the prosodic features of Camuno is required to confirm my native speaker intuition, I claim here that stress is phrasal and cannot be moved from its standard position at the right edge of the main phonological phrase. This is typologically justified, Camuno being a Gallo-Romance language, whose morpho-phonological system resembles French more than, e.g., Italian or Spanish. In such a system, intonational and main phonological phrases coincide in unmarked structures (cf. Martin 1987 for French). When informationally relevant elements like a wh-phrase are present, they must align with the position where stress is assigned, i.e., the right-edge of the phonological phrase containing the verb. This way the stress remains phrasal, but the appropriate element can be singled out.

There is several empirical evidence to support this proposal. First, a number of items can surface between the verb and the wh-phrase showing that structural adjacency is not necessary. Consequently, no stipulation of movement of the inflected verb further than the T-head is necessary. This is crucially different from Bonan's (2021) account, in which unmotivated movement of the participle is necessary to explain such exceptions to the adjacency between verb and wh-phrase. Consider (23, reported here as 26):

(26) Al   beker   l'   a   dat   *mia/ po/ amò* **ke** a la   hʧèta
     the.M butcher CL.3SG have.3SG give.PRT   NEG po   again what to the.F girl
     gier   hera?
     yesterday   evening
     'What is the x such as the butcher did not give x to the girl last night?'

All the elements intervening between the verb and the wh-phrase are discourse-oriented, or scope taking like the sentential negative particle *mia*. In other words, they are informationally prominent items that are predicted to resist evacuation, as shown by the grammaticality of (26).

Secondly, differently from Trevigiano, the element following wh-phrases can generally be freely re-ordered. According to Rizzi (1997, i.a.), the possibility of being re-ordered is a specific property of topicalized constituents. According to this view, (27) shows that the elements that surface after the wh-phrase are indeed topicalized, i.e., dislocated to avoid stress assignment.

(27) a. A=l   majat   KWANDO **la   polenta** ala ho   kà   *al   Piero*?
        have=CL.3SG eat.PRT *when*   the.F polenta at.the his house   the.M Piero
        'When did Piero eat polenta at his home?'
     b. al majat KWANDO ala ho kà **la polenta** *al Piero*?
     c. al majat KWANDO ala ho kà *al Piero* **la polenta**?
     d. al majat KWANDO **la polenta** *al Piero* ala ho kà?
     e. al majat KWANDO *al Piero* **la polenta** ala ho kà?
     f. al majat KWANDO *al Piero* ala ho kà **la polenta**?

Finally, there is only one case in which the wh-phrase can appear further away from the lexical verb: whenever the wh-phrase is left adjacent to the particle *po*. This discourse-particle can surface in any position lower than the inflected verb (28a), and it must be prosodically marked, i.e., it cannot be de-accented, and it needs to be part of the most prominent phonological phrase. When the particle needs to surface in a specific position for scope taking reasons (e.g., in contrastive focus environment as in 28b), the wh-phrase must move in order to receive sentence stress. Considering that *po* bears main sentence stress, the prosodic conditions on the wh-phrase are met regardless its linear position (28b):

(28) a. Hkri=el   (po) *ki* (po) a la   pina (po)?
        write=CL.3SG.M (po) who (po) to the.F child (po)
        'Who writes to the little girl?'
     b. Hkri=el   a la   pina *ki* po?
        write=CL.3SG.M to the.F child who po
        'Who writes to the little girl?'

In the next section, I conclude by summarizing some implications and predictions that the proposal put forward in this paper entails.

6. Conclusions

While more data needs to be collected, especially in more controlled environments, to confirm this proposal, there are several advantages in adopting an *in-situ* analysis rather than a 'short-movement' one. First of all, in principle, there is no need to postulate the presence of a [foc] feature on the wh-phrase, which does not need to move to the low focus projection. The interpretation as 'informationally relevant' is a direct consequence of the stress assignment (regardless the specific mapping between syntax and PF). This has the welcomed consequence of leaving a possible vP-peripheral position available for other elements (e.g., discourse particles). Secondly, to accommodate those data that show a number of elements intervening between the lexical verb and wh-phrase, no further movement of the participle needs to be stipulated. As discussed in the previous sections, such elements are discourse-oriented (particles and high adverbs) or scope-taking (negation and focus associative particles) elements. Hence, from an informational point of view, they can be considered with no doubts' relevant', i.e., they resist evacuation. Such a phenomenon is attested in Basque (Arregi 2002), in which certain discourse particles can appear between the otherwise indivisible verb and the focalized phrase.

If the proposal is on the right track, it could be possible to: (i) explain optionality between different types of wh-structures as a matter of PF; and (ii) extend the analysis to other NID with similar distribution. While Bonan (2021) points out that our proposal could not capture Trevigiano's pattern, it seems that Munaro's (1999, 2001) data from Bellunese could be accounted for. Given the issue with islandhood as a diagnostic device, the main difference between Lombard varieties and Bellunese seems to be the 'sentence-finality' requirement by the latter. An analysis in terms of right dislocation of unfocalized material would be compatible with Munaro's data (like the ones in (12), this paper) since the same requirement, with less prominent prosodic variation, is present in Camuno.

Finally, a proposal in terms of PF-interface phenomena, driven by information-structure constraints, can accommodate the data regarding fronting. The tendency in Camuno is to front without clefting or semi-clefting only D-linked wh-phrases, which are semantically saturated in their arguments and informationally less relevant being adjuncts. The strong preference for fronting via clefting could be explained from a PF perspective, with the need to increase the morpho-phonological 'weight' of the phonoclogical phrase hosting the fronted wh-phrase to attract stress. From a typological point of view, this possibility cannot be rejected, considering the behaviour of wh-phrase formation (cf. Martin 1987).

Future research will discuss the interpretative mechanisms involved and the possible issues related to the distribution of clitic and lexical subjects. In our system, there must be some selectional property that blocks movement of the subject to T. This point is not necessarily problematic: if subject clitics do need to appear in every sentence, we can assume that they will satisfy EPP and phi-feature in [Spec, TP], which the wh-phrase alone cannot. There will then be the need to explain why the subject moves in most declaratives, and this can have an explanation that is interconnected with the grammatical status of the clitic subject.

Regardless of the questions that the proposal leaves open – an account in which information structure and interface requirements capture the distributional pattern of Camuno has several advantages over other possible proposals. Besides only slightly modifying a more

standard account for the well-attested distribution (*in-situ* wh-phrases) in NID and other languages, there are reasons to be skeptical of a wh-short-movement that is not attested in any European language, except for Trevigiano and Portuguese (Cable 2010). Furthermore, my proposal could be applied to several phenomena involving word-order variation. The discussion must be left for future research; however, it is well-known that Spoken Latin had free word order. Recently, it has been proposed that the language was actually 'discourse-configurational' (Ledgway 2012), i.e., strongly affected by information-structure (Kiss 1995). While a precise reconstruction cannot be addressed here, it makes sense for NID to be more conservative from this point of view, given their diachronic evolution.

Abbreviations

ASP	aspectual marker	PRT	participle
CL	clitic	REFL	reflexive
DAT	dative	1SG	first person singular
F	feminine	2SG	second person singular
M	masculine	3SG	third person singular
PL	plural	1PL	first person plural
PRS	present	3PL	third person plural

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Distinguishing between POSS-*ing* and ACC-*ing*
Evidence from *with(out)*

Zi Huang

There has been disagreement concerning whether the two types of verbal gerunds in English, POSS-*ing* and ACC-*ing*, are semantically equivalent. This study focuses on a distributional difference that provides evidence for assigning different semantics to POSS-*ing* and ACC-*ing*: while both *with* and *without* can select ACC-*ing* as their complement, POSS-*ing* is only compatible with *without*. I present a semantic and pragmatic interpretation for the structure *without* + POSS-*ing*, and then discuss two explanations for the distributional asymmetry based on the assumption that POSS-*ing*, but not ACC-*ing*, should be familiar in the discourse.

1.   Introduction

The *-ing* form in English can be used to construct different nominalizations. POSS-*ing* (1) and ACC-*ing* (2) are two types of so-called verbal gerunds. Both take direct complements but differ in the way they realize the NP or pronoun preceding the gerund, which is understood as the external argument: it appears in the genitive case in POSS-*ing* and in the accusative case in ACC-*ing*.

(1)   POSS-*ing*: Clay's/his winning the match

(2)   ACC-*ing*: Clay/him winning the match

Apart from the verbal gerunds, there is a nominal gerund *-ing*$_{\text{of}}$ (3), characterized by involving an *of*-PP instead of a direct complement.

(3)   *-ing*$_{\text{of}}$: Clay's/his/the winning of the match

Vendler (1967) demonstrates that nominal gerunds, but not verbal gerunds, are compatible with what he calls 'narrow containers'. Containers are sentence roots with a gap for nominals to fit in. Narrow containers typically involve specific types of predicates such as extensional adjectives

(*fast, slow*, etc.) and eventive predicates (*take place, happen on Monday*, etc.).

(4)   a.   *Clay('s) winning the match was fast/happened on Saturday.
        b.   Clay's winning of the match was fast/happened on Saturday.

Since Vendler, the differences between verbal and nominal gerunds have been widely investigated. In order to account for the distributional data (4), most studies establish an ontological distinction between the denotations of nominal and verbal gerunds, so that narrow containers are such that they only select the denotation of nominal gerunds as their argument. While nominal gerunds invariably denote events in the analyses, POSS-*ing* and ACC-*ing* have been claimed to denote facts (Vendler 1967), propositional entities (Portner 1992, see below), states of affairs (Zucchi 1993), facts or possibilities (Asher 1993), fluents (Hamm & van Lambalgen 2002), etc.

Regardless of the exact nature of the ontological object they denote, one issue that needs to be considered is whether POSS-*ing* and ACC-*ing* are semantically equivalent. While some studies treat them as the same (Asher 1993; Hamm & van Lambalgen 2002), others point out how they might differ (Portner 1992; Grimm & McNally 2015). The aim of this paper is to discuss a piece of evidence in favor of assigning different interpretations for POSS-*ing* and ACC-*ing*: both occur as complements of *without*, but only ACC-*ing* can be selected by *with*.

(5)   a.   Clay was sent to the hospital without George('s) knowing why.
        b.   Clay was sent to the hospital with George(*'s) being informed.

In Section 2, I briefly review the differences that have been proposed between the two verbal gerunds. Section 3 focuses on the structure *without* + POSS-*ing*, which has not been accounted for in the literature, and presents a semantic and pragmatic interpretation of it. I introduce the asymmetry (5) in Section 4 and, based on the assumption that POSS-*ing* is familiar in the discourse while ACC-*ing* is not, propose two possible explanations for the incompatibility between POSS-*ing* and *with*.

2.   *Proposed differences between POSS-ing and ACC-ing*

Some studies do not distinguish between the two verbal gerunds. Asher (1993) develops a theory of nominalization within Discourse Representation Theory (Kamp & Reyle 1993) and brings in referents for possibilities and facts, which are introduced by verbal gerunds. He does not, however, discuss whether POSS-*ing* and ACC-*ing* behave differently in the discourse. He mentions a potential event denotation of POSS-*ing*, because he notices that POSS-*ing*, but not ACC-*ing*, occurs with some of the narrow containers (Asher 1993:192).

(6)   a.   {?Fred's shooting Bill/*Fred shooting Bill} took place behind the bar.
        b.   {?Fred's shooting Bill/*Fred shooting Bill} happened yesterday.

However, such data are marginal and are not accepted by most researchers. Another study that treats both verbal gerunds as equivalent is Hamm & van Lambalgen (2002): they interpret verbal gerunds as fluents, which are temporal abstracts and are accepted as one of the arguments of the predicate *HoldsAt*. Such a predicate takes a pair (f, t) of a fluent and a time and expresses that the fluent holds at time t or is true at t; events, in contrast, cannot be an argument of *HoldsAt*. Their analysis is constructed on the basis of Vendler's observation, and is not concerned with

further distinguishing between non-event-denoting expressions.

Among those studies that distinguish the two verbal gerunds semantically, I will discuss Portner (1992) and Grimm & McNally (2015). Portner (1992) proposes that verbal gerunds denote propositional entities, defined in the framework of Semantics of Situations (Kratzer 1989): propositions are sets of worlds, i.e. maximal situations, while verbal gerunds denote sets of minimal situations. He argues that the difference between POSS-*ing* and ACC-*ing* lies in that POSS-*ing* is definite and ACC-*ing* indefinite. Portner relates definiteness to factivity and presupposition. He points out that a verbal gerund expresses presupposed content when it serves as the subject (7-a) or the complement of a factive predicate (7-b): both presuppose that a situation of Clay winning the match is familiar in the discourse. When used as complements of non-factive predicates (7-c), only POSS-*ing* has a familiarity presupposition: a situation of Clay winning the match can either be actual, or hypothetical but under discussion. In contrast, ACC-*ing* in this context lacks any kind of presupposition.

(7)   a.   Clay('s) winning the match didn't bother George.
        b.   George didn't regret Clay('s) winning the match.
        c.   George didn't imagine Clay('s) winning the match.

Grimm & McNally (2015) propose that POSS-*ing* and ACC-*ing* are both event kind descriptions (see Carlson 2003; Gehrke 2019). In analogy to kinds in the entity domain (Carlson 1977), event kinds are sortal concepts that may be instantiated by an event token, which is an actual happening of the event in the relevant world.

POSS-*ing* and ACC-*ing* take different paths to becoming referring expressions. ACC-*ing* may denote an event kind without a token (8-a), or, when combined with certain predicates and anchored to the tense of the main clause, may entail that a token event exists (8-b), but the expression itself remains kind-referring .

(8)   a.   Clay winning the match is what all his fans expect to see. $\nrightarrow$ Clay won the match.
        b.   Clay winning the match upset George. $\rightarrow$ Clay won the match.

The authors assume that POSS-*ing* contains a possessive relation and therefore carries Possessive Existential Import (PEI) (Peters & Westerståhl 2013): if the possessive relation exists, the possessee must exist. The authors take this to facilitate the inference of a token event from the kind described by POSS-*ing*. However, this assumption has two problems: first, Peters & Westerståhl (2013) explicitly exclude POSS-*ing* from their discussion because it does not have the same freedom of interpretation as typical possessive structures do: when the possessee is not represented by a relational noun, the relation between possessor and possessee in an NP is freely interpretable, but the possessor in POSS-*ing* is always interpreted as the subject; second, POSS-*ing* does not necessarily carry the entailment that a token event exists. For example, when POSS-*ing* is selected by *prevent*, it is inferred that the described event does not happen.

(9)   Dave prevented Clay's winning the match. $\rightarrow$ Clay did not win the match.

The structure that will be discussed in the next section, *without* + POSS-*ing*, also lacks a token implication. I suggest that PEI, if applicable, should be reinterpreted for verbal gerunds: what necessarily exists is not an event token, but the event kind. For a kind to exist, it usually requires there to be an instance that realizes it. However, in the entity domain, kinds without instances, like unicorns, can also be talked about to the extent that they are well-established concepts in the

discourse (Mueller-Reichau 2011). Therefore, it is plausible to consider event kinds to 'exist' if they are familiar in the discourse, as put forward by Portner (1992).

In sum, though the two studies diverge in technical details, such as whether an actual event is presupposed or implied in cases like (7-a) or (8-b), both demonstrate that POSS-*ing* brings a familiarity condition either due to being definite or being a possessive structure, and that ACC-*ing* lacks such a condition. In the following sections, I apply Grimm & McNally's analysis for the interpretation of gerunds and sentences, but it can be potentially recast using situations. I will show that the contrast in (5) supports these two studies by requiring POSS-*ing* and ACC-*ing* to be semantically distinct, and familiarity alone is not sufficient for explaining the contrast.

3.   *Without + POSS-ing: Data and analysis*
3.1.   *Data*

Huddleston & Pullum (2002:461) point out that 'a gerund-participle in complement function cannot take a genitive subject' after *with* and *without*. However, the corpus study of Heyvaert et al. (2005) shows that *without* does take POSS-*ing*, a combination also found in my collection of data. I collected all the cases of POSS-*ing* from a dependency-parsed version of the British National Corpus (BNC 2007). The data were cleaned manually, excluding potentially ambiguous cases, like those containing *her* or a plural noun ending in *s* as possessor. In the resulting 818 cases, 39 or 4.7% of the cases are preceded by *without*. Here are a few examples.[1]

(10) a. She [Darren's mother] had been very ill and suddenly taken to hospital without Darren's knowing why.
      b. He was most anxious to know the result of his investigation and whether the cause of his pain could be treated without his having more time off work.
      c. This allows your sleeves to be knitted, weaving as you go, without your having to consider any shaping at the sides.

Without and its counterparts in other languages have various senses, and some of them have been formally discussed (see Bosque 1980 and Castroviejo et al. 2015 regarding Spanish, Feigenbaum 2002 regarding French and Müller et al. 2012, German), but the use of *without* + POSS-*ing* has not been accounted for.

In this use, POSS-*ing* is neither factive nor implies a token event: in (10-a) there is no token instantiation of *Darren's knowing why*. In (10-b) and (10-c), the *without*-PP modifies a VP that is embedded. I treat the *without*-PP in all these cases as a VP modifier. Specifically, I set aside the free adjunct reading (Stump 1985) in which the *without*-PP is prosodically separate from the main clause, and the adjunct may interact with elements in the main clause such as tense and modality. This can be seen in the example (11-a), where the *without*-PP modifies *passes by* and describes the way a week passes by. When the *without*-PP appears in the left periphery, (11-b) has (unnatural) readings in which the *without*-PP becomes either asserted content or the antecedent of a conditional, both of which (11-a) lacks.

(11) a. It is seldom that a week passes by without my having several letters on the same theme.

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[1] Unless otherwise noted, examples are from the BNC.

b. ?Without my having several letters on the same theme, it is seldom that a week
    passes by.

Analyzing the *without*-PP as a modifier, the modified VP and the PP are seen as a whole, as
suggested by Bosque (1980) in his discussion about Spanish *sin* 'without': the hearer infers that
the two parts connected by *sin* form one eventuality.

3.2. Interpretation of without

The basic interpretation of *without* + POSS-*ing* is that of temporal overlap: in (10-a), Darren's
ignorance is simultaneous with his mother's being rushed to hospital, but it does not rule out
the possibility that Darren might know the reason soon afterwards. Assuming the event kind
analysis of Grimm & McNally (2015), this means the event kind described by the modified VP
is instantiated (either in the actual world or in a possible world) while at the same time there is
no instantation of the event kind described by the POSS-*ing*.

In the following interpretation, $\mathbf{R}$ is the realization relation that pairs an event token with its
kind, $\tau(e)$ represents the time (interval) in which the event e occurs, and $\circ$ represents temporal
overlap. I propose that *without* connects two event kind descriptions P_{k1} and P_{k2} and produces
the description of a complex event kind e_{k3} such that any instantiation of e_{k3} entails that the
event kind described by the modified predicate (e_{k1}) is instantiated, and that at the same time,
the event kind described by the POSS-*ing* (e_{k2}) is not instantiated. If the resulting complex event
kind is to be realized, then the runtime of the complex event token $\tau(e_3)$ is identical to that of
the event token corresponding to the modified VP $\tau(e_1)$.

(12) $[\![\text{without}]\!] = \lambda P_{k2} \lambda P_{k1} \lambda e_{k3} \exists e_{k1} \exists e_{k2} [P_{k1}(e_{k1}) \wedge P_{k2}(e_{k2}) \wedge \forall e_3 [\mathbf{R}(e_3, e_{k3}) \rightarrow \exists e_1 [\mathbf{R}(e_1, e_{k1}) \wedge \neg \exists e_2 [\mathbf{R}(e_2, e_{k2}) \wedge \tau(e_1) \circ \tau(e_2)] \wedge \tau(e_3) = \tau(e_1)]]]$

Below is the derivation of the sentence (13). I follow Grimm & McNally (2015) in assuming
that the main predicate begins on the kind level and is instantiated by tense, so both *Clay win*
the match and *George's supporting Clay* are initially kind descriptions. The resolution of the
pronoun *him* to *Clay* is omitted.

(13)   Clay won the match without George's supporting him.
        = PAST($[\![$Clay win the match without George's supporting him$]\!]$)
        = PAST($[\![\text{without}]\!]([\![$George's supporting him$]\!])([\![$Clay win the match$]\!])$)

(14)   a. $[\![$Clay win the match$]\!] = \lambda e_{k1}[\mathbf{win}(e_{k1}) \wedge \mathbf{Agent}(\mathbf{c}, e_{k1}) \wedge \mathbf{Theme}(\mathbf{m}, e_{k1})]$
        b. $[\![$George's supporting Clay$]\!] = \lambda e_{k2}[\mathbf{support}(e_{k2}) \wedge \mathbf{Agent}(\mathbf{g}, e_{k2}) \wedge \mathbf{Theme}(\mathbf{c}, e_{k2})]$
        c. $[\![$without George's supporting Clay$]\!]$ = $\lambda P_{k1} \lambda e_{k3} \exists e_{k1} \exists e_{k2} [P_{k1}(e_{k1}) \wedge$
            $\mathbf{support}(e_{k2}) \wedge \mathbf{Ag}(\mathbf{g}, e_{k2}) \wedge \mathbf{Th}(\mathbf{c}, e_{k2}) \wedge \forall e_3 [\mathbf{R}(e_3, e_{k3}) \rightarrow \exists e_1 [\mathbf{R}(e_1, e_{k1}) \wedge$
            $\neg \exists e_2 [\mathbf{R}(e_2, e_{k2}) \wedge \tau(e_1) \circ \tau(e_2)] \wedge \tau(e_3) = \tau(e_1)]]]$
        d. $[\![$Clay win the match without George's supporting him$]\!]$ =
            $\lambda e_{k3} \exists e_{k1} \exists e_{k2} [\mathbf{win}(e_{k1}) \wedge \mathbf{Ag}(\mathbf{c}, e_{k1}) \wedge \mathbf{Th}(\mathbf{m}, e_{k1}) \wedge \mathbf{support}(e_{k2}) \wedge \mathbf{Ag}(\mathbf{g}, e_{k2}) \wedge$
            $\mathbf{Th}(\mathbf{c}, e_{k2}) \wedge \forall e_3 [\mathbf{R}(e_3, e_{k3}) \rightarrow \exists e_1 [\mathbf{R}(e_1, e_{k1}) \wedge \neg \exists e_2 [\mathbf{R}(e_2, e_{k2}) \wedge \tau(e_1) \circ \tau(e_2)] \wedge$
            $\tau(e_3) = \tau(e_1)]]]$
        e. PAST: $\lambda P \lambda t \exists e, e_k [t < \mathbf{now} \wedge P(e_k) \wedge \mathbf{R}(e, e_k) \wedge \tau(e) = t]$
            (Grimm & McNally 2015:91)

f. $[\![(13)]\!] = \lambda t \exists e_3, e_{k3}[t < \mathbf{now} \wedge \exists e_{k1} \exists e_{k2}[\mathbf{win}(e_{k1}) \wedge \mathbf{Ag}(\mathbf{c}, e_{k1}) \wedge \mathbf{Th}(\mathbf{m}, e_{k1}) \wedge$
    $\mathbf{support}(e_{k2}) \wedge \mathbf{Ag}(\mathbf{g}, e_{k2}) \wedge \mathbf{Th}(\mathbf{c}, e_{k2}) \wedge \forall e_3[\mathbf{R}(e_3, e_{k3}) \rightarrow \exists e_1[\mathbf{R}(e_1, e_{k1}) \wedge$
    $\neg \exists e_2[\mathbf{R}(e_2, e_{k2}) \wedge \tau(e_1) \circ \tau(e_2)] \wedge \tau(e_3) = \tau(e_1)]]] \wedge \mathbf{R}(e_3, e_{k3}) \wedge \tau(e_3) = t]$
    $= \lambda t \exists e_3, e_{k3}[t < \mathbf{now} \wedge \exists e_{k1} \exists e_{k2}[\mathbf{win}(e_{k1}) \wedge \mathbf{Ag}(\mathbf{c}, e_{k1}) \wedge \mathbf{Th}(\mathbf{m}, e_{k1}) \wedge$
    $\mathbf{support}(e_{k2}) \wedge \mathbf{Ag}(\mathbf{g}, e_{k2}) \wedge \mathbf{Th}(\mathbf{c}, e_{k2}) \wedge \exists e_1[\mathbf{R}(e_1, e_{k1}) \wedge \neg \exists e_2[\mathbf{R}(e_2, e_{k2}) \wedge \tau(e_1) \circ$
    $\tau(e_2)] \wedge \tau(e_3) = \tau(e_1)]] \wedge \mathbf{R}(e_3, e_{k3}) \wedge \tau(e_3) = t]$

This analysis captures the intuition that the *without*-PP modifies the VP, resulting in a complex event kind that can be embedded in, e.g. modals, or be instantiated as the main predicate. Therefore, as put forward by Bosque (1980), the two events connected by *without* are now seen as one.

The proposal of a complex event kind is due to the difficulty with simply modifying the main clause event kind by adding a restriction on its runtime without instantiating the kind. The creation of a new event kind suggests that the modification of the VP is potentially a non-monotonic process, that is, the resulting complex event type is not a subtype of the 'modified' kind, but a different kind with distinct implications, cf. in a context in which Clay's playing piano at 10 p.m. normally leads to his neighbor being disturbed, Clay's playing piano at 10 p.m. without his neighbor's hearing it does not.

3.3. Implicature of without: Generic incausality

An important intuition about *without* + POSS-*ing* is that it implies that normally, when an event corresponding to the modified VP occurs, there should also be an event described by the POSS-*ing*. The use of *without* + POSS-*ing* constitutes an exception to such a regularity. The interpretation of *without* proposed above does not impose any restriction on the two event kinds that it connects, but when the hearer fails to interpret a relation between the two events, the sentence will likely be anomalous. For example, if Clay is a modern gamer and the speaker does not expect him to believe in the Ancient Egyptian god Thoth, the following sentence is anomalous.

(15)   #Clay won the match without Thoth's blessing him.

By having this implication, *without* is similar to concessive connectors like *however*. Evidence for this comes from the possibility of inserting *however* between *without* and POSS-*ing*.[2]

(16)   She had been very ill and suddenly taken to hospital without, however, Darren's knowing why.

I apply the generic incausality analysis of Zieleke (2020) for German concessive connectors to account for the implicature derived from *without*. The author argues that concessive connectors like German *dennoch* 'however' and *trotzdem* 'nevertheless' carry the conventional implicature of generic incausality: a regularity which generalizes over entities, predications and/or situations and tolerates exceptions. Therefore, *p dennoch q* asserts $p \wedge q$ and produces the implicature

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[2] The insertion of *however* is not always possible. It works better when the modified VP is not embedded, and though the modified VPs in (10-b) and (10-c) are both embedded, (10-c) is much better than (10-b) after inserting *however*. The use of *however* may have independent restrictions that are not considered here, but the point is to illustrate the similarity between concessive connectors and *without*.

that $GEN(v)[P_p(v); \neg Q_q(v)]$, in which P and Q are predicates and v an unrestricted variable, which may be entities, predications and/or situations, and may vary according to context, world knowledge and the hearer's understanding. For example, (13) may have the implicature that generally for a player to win, his teammate should support him (17-a); or that normally when Clay plays, George supports him (17-b).

(17) a. $GEN(x, y)[player(x) \wedge teammate(x, y) \wedge win(x); support(y, x)]$
      b. $GEN(x, y)[x=Clay \wedge y=George \wedge play(x); support(y, x)]$

I follow Zieleke (2020) in assuming that the implication involved here is a conventional implicature: it is not a presupposition because its failure does not invalidate the assertion, and it is not a conversational implicature because it is triggered by the word *without* and is hard to cancel.

4. Asymmetry between POSS-ing and ACC-ing
4.1. Data

While POSS-*ing* can be selected by *without* and is interpretable, it appears to be incompatible with *with*. As we have seen in the last section, out of a total of 818 POSS-*ing* cases from the BNC, 39 are selected by *without*. In contrast, only 3 are complements of *with*. The only one in which *with* is not selected by the main predicate involves a modifier of the noun *dialogue*.

(18) It led to a dialogue with Montefiore, with my telling him about my friend who has had AIDS now for six years and who, thanks to AZT, is still alive.

Heyvaert et al. (2005) report the same observation in their corpus study. We can see that replacing *without* with *with* in attested *without* + POSS-*ing* cases leads to infelicity.

(19) a. #She [Darren's mother] had been very ill and suddenly taken to hospital with Darren's knowing why.
      b. #He was most anxious to know the result of his investigation and whether the cause of his pain could be treated with his going back to work immediately.
      c. #This allows your sleeves to be knitted, weaving as you go, with your ignoring the shaping at the sides.

This asymmetry also forms a contrast with ACC-*ing*, which is compatible with both *with* and *without*.[3]

(20)

	POSS-*ing*	ACC-*ing*
with	a. ??Clay won the match with George's supporting him.	c. Clay won the match with George supporting him.
without	b. Clay won the match without George's supporting him.	d. Clay won the match without George supporting him.

A potential objection to this observation is that the *-ing* form here taking an accusative external argument may not be a gerund, but a present participle, hence it is not comparable with POSS-

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[3] My corpus search shows that BNC contains around 1400 cases of *with* + ACC-*ing*, excluding ambiguous cases like those with *her* as the external argument. The number is not precise because there is noise in the data. There are 86 cases of *without* + ACC-*ing*.

ing. Though gerunds and present participles have different origins, whether they should be distinguished in Modern English is a controversial topic (see, for example, De Smet 2010). Huddleston & Pullum (2002) argue that gerunds and present participles belong to the same category of 'gerund-participials'. I will simply point out that on the intended reading,[4] *with* selects a phrase consisting of an accusative NP and an *-ing* form, which has the same surface structure as ACC-*ing*.

The asymmetry in (20) calls for different treatments of POSS-*ing* and ACC-*ing*. Given the assumption from the literature that POSS-*ing* is familiar in the discourse, the reason why it does not combine with *with* is not immediately apparent: *with* does select definite noun phrases. In accordance with the interpretation of *without* in the previous section, I propose two hypotheses to account for the infelicity of *with* + POSS-*ing*: one is the redundancy of information and the other is POSS-*ing*'s inability to be temporally anchored.

4.2. Infelicity of with + POSS-ing: Information redundancy

I assume that *with*, as the positive counterpart of *without*, would have the following denotation in combination with POSS-*ing*.[5]

(21) $\llbracket \text{with} \rrbracket = \lambda P_{k2} \lambda P_{k1} \lambda e_{k3} \exists e_{k1} \exists e_{k2}[P_{k1}(e_{k1}) \land P_{k2}(e_{k2}) \land \forall e_3[\mathbf{R}(e_3, e_{k3}) \rightarrow \exists e_1[\mathbf{R}(e_1, e_{k1}) \land \exists e_2[\mathbf{R}(e_2, e_{k2}) \land \tau(e_1) \circ \tau(e_2)] \land \tau(e_3) = \tau(e_1)]]$

It creates a complex event type whose instantiation corresponds to the simultaneous instantiation of the event kinds contributed by the modified VP and by the POSS-*ing*. This in principle does not prevent *with* from taking POSS-*ing* as its complement.

The hypothesis that *with* + POSS-*ing* carries redundant information is based on a parallel in the nominal domain. The felicity of a *with*- or *without*-PP as a noun modifier depends on whether the complement is an entailed part of the modified noun:

(22) a. ?lion with a tail
      b. lion without a tail
      c. lion with a mane
      d. lion without a mane
      e. lion with wings
      f. ?lion without wings

As with verbs, the above nominal expressions are seen as kind level before becoming NumP (Dayal 2011), where tokens are introduced by singular or plural marking, and further combining with a determiner. Being a lion entails having a tail, so (22-a) is infelicitous due to redundancy, except in specific discourse conditions (cf. the maxim of Manner in Grice 1975). (22-b) is felicitous though the kind of lion it describes is unnatural. Being a lion does not entail having or not having a mane, so both (22-c) and (22-d) are informative, thus felicitous. In (22-e) and (22-f), the *without*-PP expresses something that is understood, according to world knowledge, to not be a component of the modified noun. Therefore, (22-e) describes an uncommon or

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[4] A common use of the participle is to modify a noun. For example, *the teammate constantly betraying him* has a reading in which it is equivalent to *the teammate that constantly betrays him*. This reading is undesired here.

[5] An anonymous reviewer points out that *with(out)* + ACC-*ing* is very similar to absolutes and asks whether (21) captures the absolute reading. The representations for *with(out)* in (12) and (21) only account for the simultaneity of the events and do not capture the interaction between the *with(out)*-PP and matrix clause elements like tense or modality, as described by Stump (1985). I would follow Stump's analysis of *with* absolutes, probably recasting it in terms of Neo-Davidsonian events.

imaginary kind of lions that have wings, while (22-f) is infelicitous except in specific discourse conditions, such as in a discussion where 'lions with wings' are relevant.

I also assume that unlike *without*, *with* does not carry an implicature that triggers a contrast, because affirmation is less likely to trigger specific implicatures than negation (Umbach 2005). If the speaker would like to convey a contrast between the co-occurrence of two events and some generic rule stating that they normally do not co-occur, a better option is to use *despite*. Therefore, the use of *with* to introduce contrasts is blocked.[6]

In other cases, *with* may still interfere with the maxim of Manner, if the co-occurrence of event kinds contributed by the modified VP and POSS-*ing* has been established. For example, since somebody winning the game entails their participation in the game, the following sentence is pragmatically odd.

(23)   #Clay and George won the match as a team with George's participating in the game.

For POSS-*ing*, which is definite according to Portner (1992) and therefore familiar, its relation with the matrix clause event kind is likely known in the context. In this case, *without* is informative because it introduces an exception, but *with* is not. For example, in a context where one of the regularities in (17) is established, it is uninformative to utter ?*Clay won with George's supporting him*. ACC-*ing* is compatible with both *with* and *without* because it is indefinite and does not need to be presupposed in the context. Therefore, it introduces a new event referent and whether or not it temporally overlaps the matrix event is always informative.

An analysis based on pragmatics does not rule out the potential cases in which the co-occurrence of the two events are optional and thus informative. For example, if the context of (19-a) states that Darren is only occasionally informed of his mother's situation, then (19-a) is informative in asserting that Darren is informed in this specific case. It also predicts that, in the same context, if *with* + POSS-*ing* is rejected for redundancy, then *with* + ACC-*ing* should be redundant as well, because they contain the same information.[7] These counterarguments cannot be addressed without studying the contexts that license POSS-*ing* or carrying out empirical studies. I discuss next a different source of infelicity that is rooted in the different temporal anchoring abilities of POSS-ing and ACC-ing.

4.3.   *Infelicity of with + POSS-ing: Temporal anchoring*

The proposed denotation of *with* in (21) and that of *without* in (12) anchor the (in)occurrence of a POSS-*ing* token event to that of the modified event. The hypothesis to be explored in this subsection assumes that POSS-*ing* is not compatible with *with* because it cannot be temporally anchored.

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[6] *Despite* may not be identical to a *with* that introduces contrasts, because it has been argued that *despite* presupposes the happening of its complement. See Libert (2016) for a discussion.

[7] In a pilot study I conducted, I took original sentences from the BNC containing POSS-*ing* or ACC-*ing* and replaced the gerund with a blank space, then offered three options to choose from: POSS-*ing*, ACC-*ing* (one is the original form from the corpus and the other, the corresponding form) and 'both are possible'. Most native speakers showed a strong preference for ACC-*ing*. They preferred *without* + ACC-*ing* even if the original sentence in the corpus used POSS-*ing*; when appearing as complement of *with*, the vast majority agreed that only ACC-*ing* was available, but since I did not offer the option of 'neither POSS-*ing* nor ACC-*ing*', my data did not indicate whether ACC-*ing* would also be rejected for redundancy.

I follow both Portner (1992) and Grimm & McNally (2015) in assuming that POSS-*ing* is syntactically a possessive structure, which contributes to its definiteness. Whether ACC-*ing* is indefinite as Portner (1992) assumes is questionable, because on rare occasions it also takes a definite article (as observed by Grimm & McNally 2016). On that account, ACC-*ing* is potentially assimilated to a kind level bare singular or bare plural, but I will not distinguish it from indefinites.

Although the definiteness of POSS-*ing* derives from the possessive structure, one cannot deduce that POSS-*ing* has a certain discourse status in virtue of being a possessive structure. Willemse et al. (2009) show that theories of possessives make opposite predictions as to whether the possessee referent is given in the context, and by studying 400 prenominal possessives, they find that their discourse status form a continuum from old to fully new. The discourse status of POSS-*ing* has not been studied empirically yet.

As a definite expression, POSS-*ing* can be accommodated, but the accommodation of any POSS-*ing* is not necessarily successful. In the following example, none of the three posessives are familiar in the context (24-a), but only (24-b) is a good continuation of (24-a).

(24)   a.   This morning, Mary had breakfast at home and took the usual bus to school.
        b.   Mary's dog was taken for a walk.
        c.   ?Mary's giraffe was taken for a walk.
        d.   ?Mary's being hit by a car shocked her family.

Since an owner-dog relation is more common than an owner-giraffe relation, *Mary's dog* is more easily accommodated than *Mary's giraffe*. As for POSS-*ing*, although it always conveys a participant-event relation, the relation of anyone being a participant of any event is not commonly assumed, which also makes it hard to be accommodated.

If it is not accommodated, POSS-*ing* should be anaphoric to either a token event or the event kind, or inferrable from the context. When it refers to a token event, which is fixed in time, it cannot be temporally anchored again.[8] When it is the event kind that is under discussion, it should not be temporally anchored. *Without* + POSS-*ing* does not face a similar conflict because there is no relevant instantiation that needs to be temporally anchored. In contrast, ACC-*ing* can easily be anchored to the main clause tense because it is newly introduced and, since it is not the main predicate, does not carry its own temporal index.

If temporal anchoring is the reason behind the aymmetry between *with* + POSS-*ing* and ACC-*ing*, then we should not expect all the uses of *with* + POSS-*ing* to be infelicitous. There are other senses of *with* (e.g. 'on the basis of' or 'making use of') that are potentially compatible with POSS-*ing*, as long as POSS-*ing* is not intended to be temporally anchored to the modified VP. In the following example, Clay's victory is marked by (and therefore, temporally dependent on) his killing of the dragon, and it is perceived to be more acceptable than (19).

(25)   Clay won the match with his skillfully killing the dragon.

This hypothesis also finds a parellel in the entity domain. On my analysis, *with* creates a complex event kind which contains two event kinds as parts. Similarly, in the entity domain, if we use *with*-PP to create a new kind, it is often unnatural to have a part identified before identify-

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[8] My corpus data contain many cases in which POSS-*ing* identifies a single event. Since POSS-*ing* is not compatible with narrow containers, it is likely that it does not denote a token event, but describes a kind which is instantiated by a single token in the actual world.

ing the whole. For example in (26-a), the kind expression is odd if *the mane* refers to a token established in the discourse.

(26)   a.   ?lion with the mane
         b.   lion with that kind of mane

Though time is not involved in the entity domain, it is possible that for a similar reason *with* + POSS-*ing* is rejected in the formation of the kind. However, in the entity domain *with* can take an established kind expression: (26-b) is perfectly acceptable. If *with* takes an event kind, it is intuitive that the kind should not be anchored, but it does not prohibit the entailment that a corresponding token is temporally anchored, so it remains unclear why a kind-referring POSS-*ing* is unacceptable in the absence of an established event token.

In this section, I have discussed two hypotheses that partially explain the infelicity of *with* + POSS-*ing*, and both have imperfections. The first is pragmatic and is based on the contextual information in the discourse that licenses POSS-*ing*; it does not explain why *with* + POSS-*ing* can be judged as infelicitous without an explicit context, and ACC-*ing*, containing the same descriptive content, is felicitous. The second supposes that POSS-*ing* and ACC-*ing* have different discourse functions leading to different abilities to be temporally anchored and to form complex kinds; it does not explain why *with* + POSS-*ing* is unacceptable when not referring to a specific event token. In addition, more empirical evidence is needed to show that POSS-*ing* and ACC-*ing* differ in their discourse functions.

5.   *Conclusion*

This study addresses the issue of whether POSS-*ing* and ACC-*ing* are semantically equivalent. The asymmetry observed between POSS-*ing* and ACC-*ing* when used as complements of *with(out)* requires them to be treated differently. I propose a semantic and pragmatic interpretation of the structure *without* + POSS-*ing*, which serves as the basis for explaining the asymmetry. I discuss two explanations based on the analyses by Portner (1992) and Grimm & McNally (2015): one is information redundancy and the other is their different abilities to be temporally anchored.

Both the literature and this study involve assumptions about the discourse functions of verbal gerunds that have not been tested empirically. By assuming that POSS-*ing* is definite (or a possessive structure) and ACC-*ing* is indefinite, one may expect their distribution to assimilate that of definite (or possessive) and indefinite NPs, respectively. I have noticed in a pilot study that in the same contexts, even though the original text uses POSS-*ing*, most native speakers still prefer ACC-*ing* to POSS-*ing* (see footnote 7). This indicates that instead of necessarily introducing a new referent, ACC-*ing* may be licensed regardless of its discourse status. On the other hand, in many contexts that license POSS-*ing*, only the possessor is known, while the verb and its object are new. Future work will explore the discourse functions of verbal gerunds by both studying corpus data and carrying out empirical studies on the factors affecting the choice between POSS-*ing* and ACC-*ing*.

From the theoretical aspect, this study follows Grimm & McNally's claim that verbal gerunds are event kind descriptions, and constantly draws analogy to kinds in the entity domain. However, event kinds (as assumed to be denoted by verbal gerunds) and entity kinds may differ in

significant ways. Entity kinds are used to categorize things in human minds and intuitively have multiple realizations; verbal gerunds, in contrast, are usually used to identify a single event in the discourse. Future research will further reveal the ontological nature of verbal gerunds.

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Word order preferences with intransitive verbs in heritage and L2 Spanish

Erin Mauffray

While English only allows preverbal subjects in declarative contexts, it has been claimed that in Spanish unaccusative verbs, but not unergatives, license postverbal subjects. Experimental studies support this syntactico-semantic distinction, albeit not categorically; additional factors play a role in word order preferences, e.g., information structure. I explore the roles of verb type and adjunct placement on word order preferences in a judgment task administered to heritage, L2, and native Spanish speakers. Results suggest all groups are sensitive to these effects: speakers show a preference for preverbal subjects with unergative verbs and a tendency to accept postverbal subjects with preverbal adverbs.

1. Background
1.1. The Unaccusative Hypothesis

Perlmutter's (1978) Unaccusative Hypothesis distinguishes between two types of intransitive verbs: unergative verbs, whose Agent-like argument is generated in canonical subject position, and unaccusative verbs, whose Theme/Patient-like argument is generated lower in the structure in canonical object position. The consequences of this distinction vary cross-linguistically: in Italian and French, unergative verbs select the HAVE (It. *avere*, Fr. *avoir*) auxiliary while unaccusative verbs select the BE auxiliary (It. *essere*, Fr. *être*). In Spanish, it is generally accepted that in typical declarative contexts, unaccusative verbs license postverbal subjects, which may remain *in situ*, while unergative verbs do not (see Torrego 1989; Fernández Soriano 1999; Zagona 2002; etc.).

(1)   a.   María corrió.
           María run.PST.3SG
      b.   *Corrió   María.
            run.PST.3SG María
            'María ran.'

(2)   a.   Juan llegó.
           Juan arrive.PST.3SG
      b.   Llegó   Juan.
           arrive.PST.3SG Juan
           'Juan arrived.'

We can see in (1a) that the unergative verb *correr* 'run' appears in subject, verb (henceforth, SV) word order, while the verb, subject (VS) word order shown in (1b) is infelicitous in typical declarative contexts with unergative verbs.[1] In contrast, with the unaccusative verb *llegar* 'arrive', both the SV (2a) and the VS (2b) word orders are felicitous, and it is often assumed that VS is the preferred word order for unaccusative verbs in Spanish (e.g., Zagona 2002).

   Other syntactic reflexes of unaccusativity in Spanish include the participial absolutive construction (3, 4) and postverbal bare plural subjects (7, 8) (Bosque Muñoz & Gutiérrez-Rexach 2009).

(3)   Pasadas   dos   horas, salimos   a comer.
      pass.PTCP.ABS.F.PL two   hours leave.PRS.3SG a eat.INF
      'Two hours passed, we go out to eat.'

(4)   *Sonreído   Juan, salimos   a comer.
      smile.PTCP.ABS.F.SG Juan leave.PRS.3SG   a eat.INF
      'Smiled Juan, we go out to eat.
                                   (Bosque Muñoz & Gutiérrez-Rexach 2009:395)

The participial absolutive construction in (3) with unaccusative *pasar* 'pass' is licit while the same construction with unergative *sonreír* 'smile' in (4) is ungrammatical. We see another reflex of this in Italian, where in compound verb constructions, the unaccusative participle appearing with *essere* inflects for the gender and number of the grammatical subject (5) and the unergative participle appearing with *avere* does not (6).

(5)   Maria è   *arrivato/   arrivata.
      Maria AUX.BE   arrive.PTCP.M/   arrive.PTCP.F
      'Maria arrived.'

(6)   Maria ha   telefonato/   *telefonata.
      Maria AUX.HAVE   telephone.PTCP.M/telephone.PTCP.F
      'Maria called.'
                                   (Bosque Muñoz & Gutiérrez-Rexach 2009:393)

In this way, unaccusatives pattern with objects of transitive verbs, which may be modified with participles inflected for gender and number in Italian.

   Now we consider postverbal bare plurals, lacking determiners, in Spanish.

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[1] By 'typical, declarative contexts,' I refer to sentences with unmarked focus features. Some refer to this as 'broad focus' (e.g., Lozano 2006) or 'sentence focus' (Nishida et al. 2020). I contrast this with presentational or narrow focus, which is discussed in the following section.

(7) Pasaron   horas.
     pass.PST.3PL hours
     'Hours passed.'

(8) *Sonrió   Juan.
     smile.PST.3PL Juan
     'Juan smiled.'

(9) Compramos   manzanas.
     buy.PST.1PL apples
     'We bought apples.'

In (7) with unaccusative *pasar* 'pass', a postverbal bare plural, normally not licensed in subject position in Spanish, is licit, while with unergative *sonreír* 'smile' in (8), the postverbal bare plural is ungrammatical. We can see in (9) with transitive *comprar* 'buy', we can have a postverbal bare plural, another way in which the subject of unaccusative verbs, e.g., *horas* in (7), patterns with the accusative object of transitive verbs, e.g., *manzanas* in (9).

The difference between unaccusatives and unergatives lies in the position in which the subject is assumed to be generated: structurally, the syntactic subject of unergative verbs is generated in canonical subject position in Spec,*v*P (10), while the syntactic subject of unaccusative verbs is generated lower, postverbally, in canonical object position as complement to V (11). From this position, the external argument of an unaccusative verb may move through Spec,*v*P then to Spec,TP to appear in preverbal position or, crucially to the present study, the subject may remain *in situ*, making the postverbal position, or VS word order, an option for unaccusative verbs even in broad focus contexts.[2]

(10)

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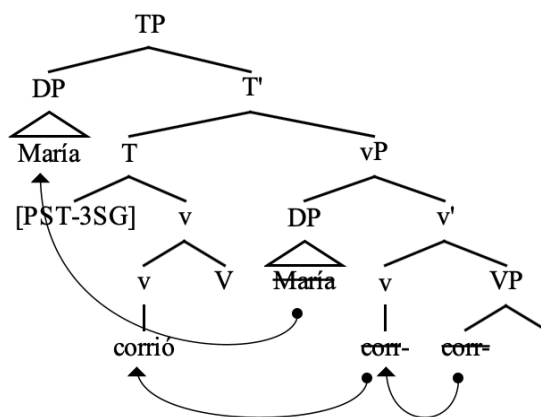
[2] If an unaccusative subject stays *in situ* where it is generated, it is pertinent to consider how the Extended Project Principle (Chomsky 1982) is satisfied. Some suggest there is a coindexed *pro* in Spec,TP (Burzio 1986). The satisfaction (or not) of EPP will not enter into the analysis here and is left to the reader to consider.

(11)
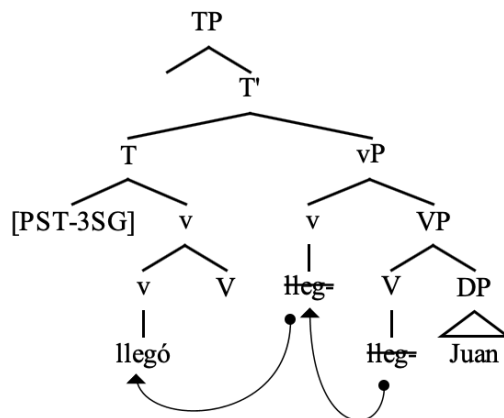
The subtle structural distinction between unergative verbs exemplified in (10) and unaccusative verbs exemplified in (11) offers an ideal target for acquisitional studies, given the learnability problem it poses. Spanish learners lack negative evidence (the opportunity to be corrected in the selection of the auxiliary, as in Italian and French, for example) of the unaccusative/unergative distinction, and, as Montrul states, 'the unaccusative/unergative distinction is *never* taught in language classrooms and is underrepresented in language teaching materials' (2004:240). However, as we will see, monolingually-raised native speakers, heritage speakers and L2 speakers all show some sensitivity to this distinction. Given that the VS word order is not available in English, unaccusative verbs' licensing of the VS order offers an interesting target for investigation of syntactic transfer and/or attrition.

1.2 The Unaccusativity Hierarchy

Sorace (2000) found that the unaccusative/unergative distinction's effect on auxiliary selection in Italian may be more gradient than categorical and proposes a hierarchy of unaccusativity. At one extreme of the hierarchy are unergative verbs such as *talk* and *sing* which select agentive arguments and describe atelic events with unspecified endpoints. These core unergatives encode non-motional processes. Less core unergatives describe motional processes, and peripheral unergatives describe uncontrolled processes. In the middle of the hierarchy, Sorace places the existence of state verbs, followed by the peripheral unaccusatives that describe a continuation of state, then the less core unaccusatives that describe a change of state. At the opposite end of the hierarchy are core unaccusative verbs such as *arrive* and *fall* which describe a change of location, select arguments with little-to-no Agent role, and describe telic events with specified endpoints. Verbs at each end of the hierarchy show consistent auxiliary selection (i.e., unergatives select *avere* 'have' and unaccusatives select *essere* 'be'), but those in the middle of the hierarchy show sensitivity to additional information, such as telicity. For example, Sorace (2004) found that the unergative verb *run*, when used with a phrase that gives the verb a more telic meaning (associated more with unaccusativity), the verb selects the be auxiliary.

Ibarrondo (2018), however, found that a verb's location on the Unaccusativity Hierarchy did not affect its behavior with certain tests for unaccusativity in Spanish (e.g., VS order, bare plurals, absolute constructions). Roggia (2011) also found that a verb's placement on the Unaccusativity Hierarchy did not affect native speakers' acceptance or rejection of postverbal subjects in expected ways: they found more consistent auxiliary selection in the middle of the

Hierarchy, with the verbs that were peripheral to their categories of unergative and unaccusative. I will control for, but not test, the Unaccusativity Hierarchy in this study.

1.3. Information structure and word order

An important factor influencing word order in Spanish is information structure. Comrie (1989) asserts that a focused constituent is a constituent with new information in a sentence. Focused arguments in Spanish may appear in the rightmost position in order to receive nuclear stress (Zubizarreta 1998), which primes VS order.

(12) ¿Quién fue   a   casa?
      Who   go.PST.3SG to   house
      'Who went home?'
      Fue   a   casa   José.
      go.PST.3SG   to   house José.FOC
      'JOSÉ went home.'   (Zagona 2002, pp. 210-211)

In (12), the argument *Jose* is focused and may appear postverbally. In Section 1.4 we will see experiments which prime argument focus contexts and broad focus contexts by asking 'Who V-ed?' and 'What happened?', respectively. The expectation is that argument focus contexts will result in speakers' acceptance of VS order regardless of verb type, and experimental work (Lozano 2006; De Prada Pérez & Pascual y Cabo 2012; etc.) described below supports this idea.

   Further, topicalization of an adjunct XP may also prime VS order, given that if the subject is postverbal, the Spec,TP[3] position may be open (Zubizarreta 1998; Zagona 2002). The position of an adjunct in sentences in Spanish may affect the speaker's parsing of the sentence and its information structure and thus affect the acceptability of different word orders. Torrego (1989) suggests that the appearance of a locative expression in phrase-initial position, presumably topicalized, will license an unaccusative/unergative alternation in which the subject of an unergative verb may appear postverbally, despite this position being non-canonical for unergative verbs.

(13) En este   parque juegan   niños.
      in this   park   play.PRS.3SG children
      'Children play in this park.'   (Torrego 1989:255)

In (13) we see the unergative verb *jugar* 'play' appearing felicitously with a postverbal subject when a locative expression, *en este parque* 'in this park', appears in preverbal position. Both Nishida et al. (2020) and Roggia (2011) (described in Section 1.3) found that adjunct position, specifically an 'explicit stage topic' and an adverbial, respectively, affected subject position in Spanish: phrase-initial or preverbal adjuncts license postverbal subjects. Given these considerations for information structure, the extant work on focus and word order in Spanish, and the results from production studies supporting the idea that topicalized adjuncts also affect word order in Spanish, I will control for adverb position in order to assess the effects of phrase-initial adverbs, presumably analyzed as topicalized adjuncts, on the acceptance of postverbal subjects.

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[3] Referred to as Spec,IP in Zubizarreta (1998) and Zagona (2002).

1.4. Heritage and L2 speakers

Heritage speakers are a subset of native speakers sometimes described as early and/or simultaneous bilinguals. The heritage speakers of Spanish we will examine grew up in a region where English is the dominant language but in a home where Spanish is spoken (Wiley & Valdés 2000). Heritage speakers offer an interesting comparison with the typical L2 classroom learner: if heritage speakers pattern with L2 learners who share the dominant language as their L1, this would suggest that this is an area of grammar that is susceptible to negative transfer; if heritage speakers pattern with monolingually-raised native speakers whose home language is also the dominant language in their region, we gain insight into what features of the grammar may be more robust and less vulnerable to attrition.

Because postverbal subjects, or the VS order, are available in Spanish, but not English, we can investigate L1/dominant language transfer from English along the unaccusative/unergative distinction, given that unaccusative verbs in Spanish license the VS order, but not in English. Further, we can explore the effects of the position of an adverbial phrase, given that topicalized or preverbal adverbs have been shown to license postverbal subjects in Spanish (Torrego 1989; Roggia 2011; Nishida et al. 2020), but not in English.

1.5. Previous experimental work with intransitive verbs in Spanish

Previous experimental work with intransitive verbs in Spanish varies. While some test purely syntactico-semantic features of unaccusative and unergative verbs, such as the acceptability of postverbal subjects, participial absolute constructions, and bare plurals, others investigate the effects of argument focus, as well as intransitive verb type, on word order. Further, some find interactions between adjunct position and word order with intransitive verbs in Spanish, suggesting some interaction with topicalization.

Montrul (2005) conducted an acceptability judgment task (AJT) with monolingually-raised native speakers ($n = 28$), heritage speakers ($n = 36$), and (L1 English) L2 speakers ($n = 71$), testing different syntactic correlates of unaccusativity, including postverbal subjects (licensed by unaccusative verbs), the participial absolute construction (allowed with telic unaccusatives) and postverbal bare plural subjects (allowed with certain unaccusatives). Participants rated sentences on a five-point Likert scale from 1 to 5. Regarding word order, Montrul (2005) found that monolingually-raised native speakers, advanced proficiency heritage speakers and advanced proficiency L2 speakers all discriminate syntactically between postverbal subjects with unaccusatives and unergatives, assigning higher ratings to postverbal subjects with unaccusatives (NS $M = 4.84$; HS $M = 4.73$; L2 $M = 3.97$) than with unergatives (NS $M = 4.5$; HS $M = 4.48$; L2 $M = 3.74$).

Lozano (2006) tested two properties that govern word order in Spanish: the Unaccusative Hypothesis (Perlmutter 1978), which assigns different syntactic structures to unergative and unaccusative verbs such that VS is only possible with unaccusative verbs in broad focus, and a discursive constraint, that focused arguments appear in the rightmost position in Spanish in order to receive nuclear prosodic stress (Zubizarreta 1998). The expectation is that the discursive constraint will prove more difficult for learners to master given that it lies at the syntax-discourse interface. In this study, three groups completed a contextualized acceptability judgment task with items in broad and narrow focus with unaccusative and unergative verbs. The groups included native Spanish speaker controls ($n = 14$), L1 British English L2 Spanish speakers ($n = 17$), and L1 Greek L2 Spanish speakers ($n = 18$). In both Greek and Spanish, VS

is considered the preferred order for sentences with unaccusative verbs, while in English, as mentioned above, VS is not available. Stimuli were presented with two sentences at once, one with SV order and one with VS order, and participants rated both sentences on a Likert scale of -2 to 2. Focus was distinguished contextually, with broad focus contexts elicited with the question 'What happened?' and narrow focus contexts elicited with 'Who V-ed?', both in Spanish.

(14) Tú estás en una fiesta con tu amiga Laura. Laura sale de la habitación y en ese momento llega la policía porque hay mucho ruido en la fiesta. Cuando Laura vuelve, te pregunta: '¿Quién llegó?/¿Qué pasó?' Tú contestas:
a. La policía llegó. -2 -1 0 +1 +2
b. Llegó la policía. -2 -1 0 +1 +2
'You are at a party with your friend Laura. Laura leaves the room and at that moment, the police arrive because the party is too noisy. When Laura comes back, she asks you: 'Who arrived?/What happened?' You answer:
a. The police arrived. -2 -1 0 +1 +2
b. Arrived the police. -2 -1 0 +1 +2'   (Lozano 2006:165)

It was expected that with unaccusative verbs such as *llegar* 'arrive', shown in (14), VS would be the preferred word order in both broad and narrow focus, while unergative verbs such as *gritar* 'shout' would yield SV word order in broad focus and VS word order in narrow focus. Results confirmed the hypothesis that the discursive constraint would be more difficult for L2 speakers: L2 speakers in both groups preferred SV for unergatives and VS for unaccusatives in broad focus contexts, converging with native patterns, an interesting finding given that only one L2 group (the L1 Greek group) speaks an L1 with the VS order available. However, L2 speakers did not demonstrate a preference for VS order in argument, or narrow focus contexts with either verb type, diverging with the native speaker controls who do prefer VS in presentational focus contexts with both verb types.

Domínguez and Arche (2008) investigated the acquisition of VS word order in a context dependent preference task with unaccusative verbs, unergative verbs and transitive verbs in broad and narrow focus contexts. They also included clitic left dislocations (CLLD) which, like unaccusative verbs, should yield the VS order. Participants included L1 English L2 Spanish speakers (*n* = 60) divided into three proficiency levels and native speaker controls from Spain (*n* = 20). Speakers were given the option to choose the SV word order, the VS word order or both based upon the context given. They found that advanced L2 speakers and native speakers both preferred VS with unaccusative verbs (broad and narrow focus) and CLLD. They reject the idea that VS optionality is due to a pragmatic deficit given that CLLD, like focus, is also governed by pragmatic principles. The rejection of the inverted (VS) option by beginner and intermediate learners was not affected by the verb type or pragmatic conditions of the stimuli (unlike NS, who significantly preferred VS with narrow focus *and* with unaccusative verbs).

In a 2012 study, De Prada Perez and Pascual y Cabo also tested the effects of unaccusativity in addition to presentational focus on word order in monolingually-raised native speakers (*n* = 10) and heritage speakers (*n* = 61) of Spanish. Stimuli included a context presented in English and a question in Spanish, to which participants rated four possible answers on a scale from -2 to 2 (excluding 0): grammatical preverbal and postverbal sentences and ungrammatical (with an error in subject-verb agreement) preverbal and postverbal sentences. Interestingly and unlike the results found in Lozano (2006), both the control group and the HS group maintained preference for VS in narrow focus contexts, while the control group also preferred VS in broad

focus contexts with unaccusatives and, unlike Lozano's (2006) L2 speakers, the HS group did not show a preference for SV or VS with unaccusatives.

In an oral production study (2007), Pascual investigated the acquisition of word order with intransitive verbs by L1 English L2 Spanish speakers ($n = 65$, split across various levels of Spanish proficiency) in the context of study abroad experience versus no study abroad experience. Through a structured interview and video re-telling task, they found that beginner and intermediate learners use the VS order rarely but that those speakers with more advanced proficiency and more study abroad experience produced VS order with unaccusative verbs at a rate ($M = 49.53\%$) similar to native speakers ($M = 54\%$).

Nishida et al. (2020) investigated the effects of focus and unaccusativity on word order in both a judgment task and a written production task for monolingually-raised native ($n = 17$), heritage ($n = 61$) and (L1 English) L2 ($n = 34$) Spanish speakers. In the judgment task, participants chose between the SV, VS or SV/VS (both) word orders for filling in the blank in a text passage extracted from the CREA corpus (Real Academia Española). They found that native speakers, heritage speakers, and advanced L2 speakers prefer SV with unergatives and VS with unaccusatives. In written production, however, L2 speakers generalized the SV word order to both verb types while native speakers maintained the preference for VS with unaccusatives. Further, the heritage speakers in their study showed preference for VS with unaccusatives in the written production task, particularly with heavy subjects (> 4 words) and in sentences with what the authors term 'explicit stage topics', in sentences with topicalized adverbials.

In his dissertation, Roggia (2011) investigated what he calls the Split Intransitivity Hierarchy, referred to as Sorace's Unaccusativity Hierarchy (2000) in other works, in adult native speakers of Mexican Spanish ($n = 32$) in both a contextualized acceptability judgment task and an oral production task. Similar to Lozano (2006), in the acceptability judgment task, participants rated answers to the questions 'What happened?' (broad focus) and 'Who V-ed?' (narrow focus) in Spanish on a 5-point Likert scale. Both the preverbal and postverbal subject conditions were presented at the same time. Participants showed a preference for the VS order with both core unaccusative and core unergative verbs, an unexpected result given the prediction that the VS order would be rejected for the 'most' unergative verbs. Further, participants showed a general preference for the SV order, conflicting with previous results (e.g., Lozano 2006) suggesting NS prefer VS with unaccusative verbs.

In the oral production task, Roggia found that speakers preferred SV with unergatives and VS with unaccusatives, a more expected result than that of the AJT in the same study (in which speakers showed no statistical preference for VS with unaccusatives). However, only core unaccusative verbs yielded statistically significant preference for VS. Crucial to the present study, Roggia found that word order was affected more by the location of the adverbial phrase than by verb type: specifically, in sentences with adverbial phrases before or between the verb and subject, speakers preferred VS order, and in sentences with the adverbial phrase after the verb and subject, speakers preferred the SV order.

To summarize, while some find some find expected preference for, or acceptance of, VS with unaccusative verbs among native speakers (Montrul 2005; Lozano 2006; de Prada Pérez & Pascual y Cabo 2012; Nishida et al. 2020), not all do (Roggia 2011). Results from studies with heritage speakers suggest that they are sensitive to the unaccusative/unergative distinction in judgment tasks (Montrul 2005; Nishida et al. 2020). HS also show preferences for VS along other factors, such as in argument focus contexts (in a judgment task, De Prada Pérez & Pascual y Cabo 2012) or with topicalized adjuncts ('explicit stage topics') in production (Nishida et al. 2020). Similarly, in an oral production task, Roggia (2011) found that native speakers prefer the VS order when an adverbial phrase appears before or between the subject and verb. L2

speakers show variable behavior: some find that advanced speakers rate postverbal subjects higher with unaccusatives than with unergatives in judgment tasks (Montrul 2005; Domínguez & Arche 2008; Nishida et al. 2020). In production tasks, Pascual (2007) found that only advanced speakers with more exposure to the target language produce VS with unaccusatives similarly to native speakers, and Nishida et al. (2020) found that L2 speakers generalize the SV order to both verb types in written production.

Crucially, the acceptability judgment studies described above (Lozano 2006; Roggia 2011; De Prada Pérez & Pascual y Cabo 2012; Nishida et al. 2020) presented both SV order and VS order at the same time, which certainly affected the results of the studies, given that speakers were evaluating the two orders in reference to one another. I aim to approximate speakers' acceptance (and rejection) of specific word orders without reference to the alternate word order for the same item. Further, none of the studies described above controlled for adjunct position as a factor in a judgment task, and I aim to contribute to the literature by doing just that.

2. The present study

Given the lack of consistent results even among NS, I aim to investigate word order preferences with intransitive verbs by carefully manipulating verb type and adverb position. I will investigate the effects of these two factors, which are not taught explicitly in the classroom and thus offer interesting insight into learnability and innateness. Specifically, I ask:

1. Does intransitive verb type affect word order preferences for native, heritage and L2 speakers?
   - If there is attrition or transfer of word order from the dominant language (English), HS and L2 speakers should prefer preverbal subjects, or the SV order, for both verb types.
   - If the unaccusative/unergative distinction and the ways in which it conditions word order in Spanish are accessible and robust, HS and/or L2 speakers will not show a preference for preverbal subjects, or SV order, with unaccusative verbs but will pattern more closely with NS.

2. Does adverb position affect word order preferences in an acceptability judgment task for these groups?
   - If there is transfer of English word order, I expect HS and L2 speakers to prefer SV regardless of adverb position.
   - If HS and L2 speakers recognize subtle structural differences in word order in Spanish without overt instruction, adverb position will temper their acceptance of the VS word order – more specifically, they will be more likely to accept postverbal subjects with preverbal adverbs (AVS order).

2.1. Method

An acceptability judgment task was administered online using Google forms. Participants rated sentences with different word orders on a 5-point Likert scale from 1, *no suena nada natural* 'it does not sound natural at all', to 5, *suena totalmente natural* 'it sounds completely natural'. Unlike in previous studies, participants rated sentences without being provided a specific

context invoking focus conditions.[4] There were two balanced versions of the task, each a set of 75 pseudo-randomized items described in section 2.3 below. All materials, including recruitment, the Bilingual Language Profile (BLP; Birdsong et al. 2012) and the judgment task, were presented in Spanish.

2.2. Participants

Participants were recruited online via social media and email announcements in Spanish. Participants include adults from three groups: monolingually-raised native speakers (NS) (*n* = 14), heritage speakers (HS) (*n* = 32) and L2 speakers (L2) (*n* = 21).

Group	Native speakers	Heritage speakers	L2 speakers
Number	14	32	21
Mean age (SD)	31.5 (12.5)	21.4 (4.22)	31.4 (12.4)
Age range	20-56	18-37	18-59
Gender	F: 8 M: 6	F: 24 M: 7 Non-binary: 1	F: 15 M: 7
Mean age at beginning of Spanish learning	0	.11	12.8
Mean age at beginning of English learning	11.2	3.3	0
Mean BLP score (SD)	75.08	-23.9 (36.98)	-100.87
Highest completed education level	Some university: 6 University diploma: 2 Master's: 4 Doctorate: 2	High school: 4 Some university: 20 University diploma: 6 Master's: 2	High school: 1 Some university: 4 University diploma: 4 Master's: 7 Doctorate: 5

Table 1. Summary of Bilingual Language Profile by group

Participants completed an adapted version of the BLP in Spanish in order to assess group placement. Summary information about the participant groups is found in Table 1 above. A positive score on this BLP indicates Spanish dominance, while a negative score indicates English dominance. For the questions *¿A qué edad empezaste a aprender español/inglés?* 'At what age did you begin learning Spanish/English?', *desde el nacimiento* 'from birth' was coded as 0 (years). Speakers who indicated spending 30% or more of their total speaking time (with friends, family, and at work/school) in an L3 were excluded (NS: *n* = 2; HS: *n* = 1; L2: *n* = 3).

2.3. Materials

Participants completed three guided practice trials with transitive verbs and rated 48 target sentences with four different word orders: subject, verb, adverb (SVA); adverb, subject, verb (ASV), adverb, verb, subject (AVS) and verb, adverb, subject (VSA). Subjects included simple DPs (determiner + noun) and proper names only in order to control for length or heaviness of subject, heavier subjects being associated with postverbal subjects, and animacy or agentivity,

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[4] Previous studies have presented the context in English (De Prada Pérez & Pascual y Cabo 2012) to avoid priming in Spanish, but presenting a context in English presents its own set of priming issues.

a factor associated with unaccusativity, with unergative arguments typically encoding higher agentivity than unaccusatives. Test sentences were balanced according to the Unaccusativity Hierarchy (Sorace 2000).[5]

Unergative verbs	Category	Hierarchy Position	Category	Unaccusative verbs
gritar 'scream'	non-motional controlled process	core	change of location	*caerse* 'fall'
rezar 'pray'				*llegar* 'arrive'
silbar 'whistle'				*resbalar* 'slip'
renunciar 'quit'				*regresar* 'return'
trabajar 'work'				*volver* 'return'
bailar 'dance'	motional controlled process	less core	change of state	*crecer* 'grow'
correr 'run'				*desaparecer* 'disappear'
patinar 'skate'				*morirse* 'die'
saltar 'jump'				*nacer* 'born'
viajar 'travel'				*perderse* 'get lost'
viajar 'travel'				*reaparecer* 'reappear'
llorar 'cry'	uncontrolled process	peripheral	existence/continuation of state	*faltar* 'miss'

Table 2. Test verbs, hierarchy position, and category

Adjuncts included temporal and locative adverbs with 2-3 syllables, balanced across conditions. We see examples of test sentences with unergative verbs and unaccusative verbs with the four tested word orders below. It was expected that the SVA order (15) would be rated highest of the four orders with unergative verbs. While it was expected that SVA would also be rated high with unaccusative verbs (16), it was expected that the AVS order would be rated highest with unaccusative verbs (18). Results from previous studies are inconclusive as to the appropriate expectations for the AVS order with unergatives (17), as well as the ASV (19, 20) order generally.

(15) Juan nadó   ahí.   (unergative, SVA)
     Juan swim.PST.3SG   there
     'Juan swam there.'

(16) Mi   sobrino nació   ayer.   (unaccusative, SVA)
      My   nephew born.PST.3SG yesterday
     'My nephew was born yesterday.'

(17) ?Hoy   corrió   Felipe.   (unergative AVS)
     Today   run.PST.3SG   Felipe.
     'Today Felipe ran.'

(18) Entonces   llegó   Diego.   (unaccusative, AVS)
     Then   arrive.PST.3SG Diego
     'Then Diego arrived.'

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[5] Following Roggia (2011), we collapse Sorace's 'existence of state' and 'continuation of state' into one category.

(19) ?Entonces   la   empleada   renunció.   (unergative, ASV)
     Then   the   employee   quit.PST.3SG
     'Then the employee quit.'

(20) ?Allí   la   niñita   reapareció.   (unaccusative, ASV)
     There   the   girl   reappear.PST.3SG
     'The girl reappeared there.'

Results from Roggia (2011) regarding adverbial placement in the oral production task suggest that the VSA order will be rejected, given that participants in that study preferred preverbal subjects with postverbal adverbs and vice versa. However *a priori* it stands to reason that the VSA order may be judged more acceptable with unaccusatives (22) than with unergative verbs (21), given that the postverbal subject is licensed even in broad focus, declarative contexts with unaccusatives.

(21) *Rezó   Gabriela anoche.   (unergative, VSA)
     Pray.PST.3SG Gabriela last night
     'Gabriela prayed last night.'

(22) ?Regresó   Mamá pronto.   (unaccusative, VSA)
     Return.PST.3SG   Mama soon
     'Mama returned soon.'

There were 24 control and filler sentences with a subject (S), transitive verb (V), direct object (O), and adverb (A), presented in four different word orders: ASVO (23a) and SVOA (23b) (grammatical controls); VSOA (23c) (ungrammatical controls); and AVSO (23d) (fillers).

(23) a. Esta tarde   la chica prendió   la vela.
        This afternoon the girl light.PST.3SG the candle
     b. La   chica prendió   la vela   esta tarde.
        The   girl light.PST.3SG the candle this   afternoon
     c. *Esta tarde   prendió   la vela   la chica.
        This afternoon   light.PST.3SG the candle the girl
     d. ?Esta tarde   prendió   la chica la vela.
        This   afternoon light.PST.3SG the girl the candle
          'This afternoon the girl lit the candle.'

Participants who failed more than 30% of the controls, by assigning 4s and 5s to ungrammatical controls and/or by assigning 1s and 2s to grammatical controls, were excluded (NS: $n = 4$; HS: $n = 6$, L2: $n = 4$).

   The experimental design is a factorial $2 \times 2 \times 2 \times 3$ design with the following factors and levels: verb type (unaccusative/unergative), subject position (preverbal or postverbal), adverb position (phrase-initial/phrase-final) and group (NS/HS/L2). For example, in (22) above we have an unaccusative verb 'return' with a postverbal subject and a phrase-final adverb.

   Trials were presented in two pseudo-randomized lists, each participant seeing only one list. The same verb appeared with only two of four word orders in each list, e.g., unaccusative *llegar* 'arrive' appeared in ASV and AVS order in list 1 and SVA and VSA order in list 2. Trials were arranged so there was distance between items with the same verb and with the same condition, i.e., the same verb and the same condition never appeared consecutively.

3. Results

We begin with a visualization of the mean ratings by verb type and word order for each group in Figures 1, 2, and 3.
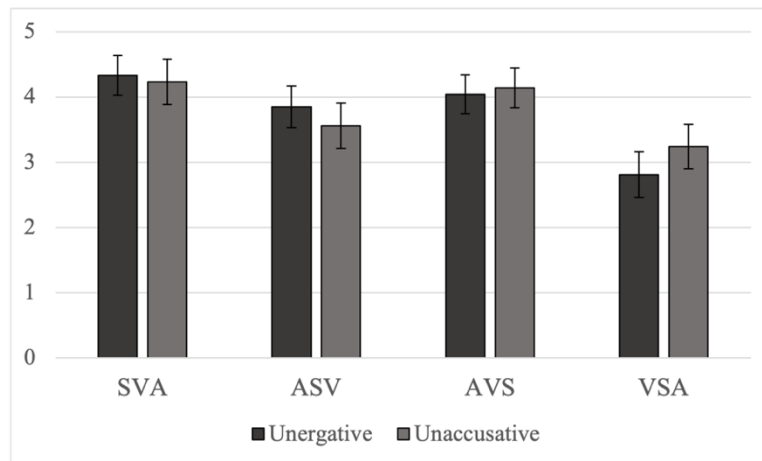
Figure 1. Mean ratings by native speakers by verb type and word order

Mean ratings shown in Figure 1 suggest more determinate judgments by native speakers, who used a wider variety of ratings and assigned lower ratings to the most infelicitous order, VSA, ($M = 3.02$, $SD = 1.03$), than heritage speakers ($M = 3.24$, $SD = 1.27$) (Figure 2) and L2 speakers ($M = 3.62$, $SD = 1.29$) (Figure 3).
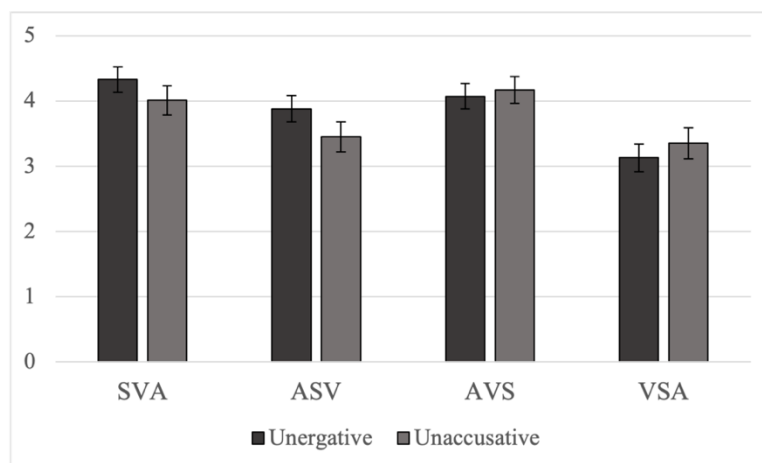
Figure 2. Mean ratings by heritage speakers by verb type and word order
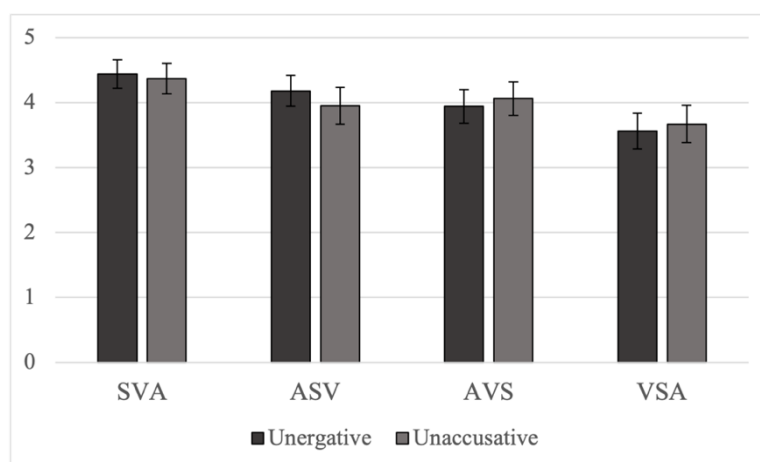
Figure 3. Mean ratings by L2 speakers by verb type and word order

The mean ratings in Figures 1-3 suggest specific preferences along the factors considered in this study. In what follows, we explore the statistical significance of these preferences.

3.1. Analysis

I ran a linear mixed effects model on 3,216 tokens of test items with the lme4 package (Bates et al. 2020) in R (R Core Team 2017). I included fixed effects for VERB TYPE:UNACCUSATIVE/UNERGATIVE, SUBJECT POSITION:SV/VS, ADVERB POSITION:INITIAL/FINAL and GROUP:NS/HS/L2, as well as random effects for ITEM and PARTICIPANT.[6] I included all interactions in the model, yielding the following structure:

(24)   lmer(Rating ~ VERB.TYPE*SUBJECT.POS*ADVERB.POS*GROUP + (1|ITEM) +
        (1|PARTICIPANT))

Data were coded with deviation coding to compare conditions to the grand mean. I found a significant main effect for SUBJECT POSITION: preverbal subjects (M = 4.03, SE = .033, t = -9.03, p < .001) were rated higher than postverbal subjects (M = 3.7, SE = .032) overall. I also found a significant main effect for ADVERB POSITION, with phrase-initial adverbs (M = 3.95, SE = .03, t = 4.59, p < .001) rated higher than phrase-final adverbs overall (M = 3.78, SE = .03). In what follows I explore the significant two-way interactions of SUBJECT POSITION × VERB TYPE (Section 3.2) and SUBJECT POSITION × ADVERB POSITION and the three-way interaction of SUBJECT POSITION × ADVERB POSITION × GROUP (Section 3.3).

3.2. Verb type

A significant interaction between VERB TYPE and SUBJECT POSITION (Estimate = .405, SE = .078, t = 5.16, p < .001) suggests that verb type does affect word order preferences in a judgment task.

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[6] We ran several different models with fewer interactions, but the full model was the best fit as estimated by Akaike's Information Criteria (AIC) values.
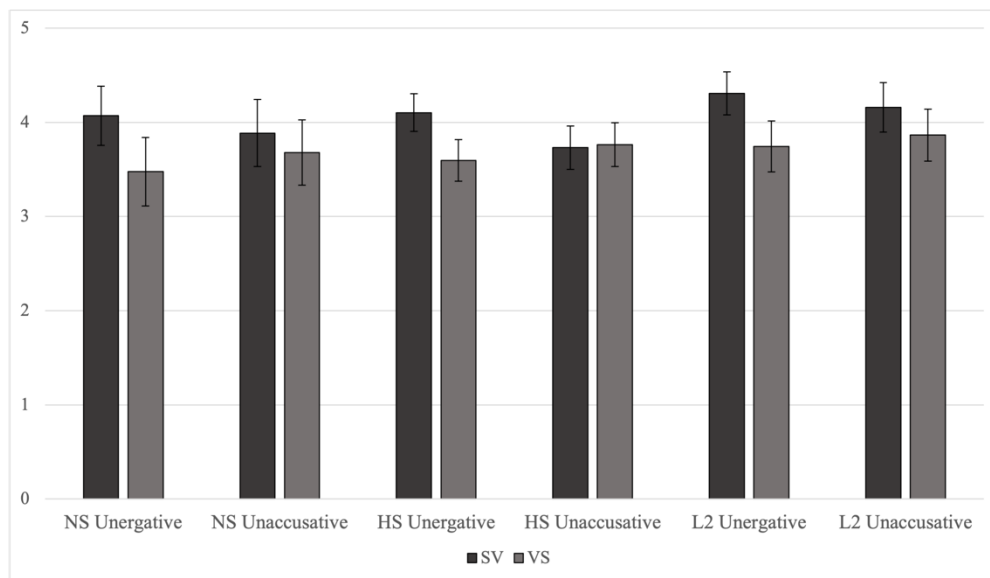
Figure 4. Mean rating by verb type, subject position, and speaker group

In Figure 4 we can see that with unergative verbs, preverbal subjects, i.e., the SV order (NS: *M* = 4.07, *SD* = 1.26, *SE* = .314; HS: *M* = 4.1, *SD* = 1.14, *SE* = .2; L2: *M* = 4.31, *SD* = 1.04, *SE* = .228) were significantly preferable (Estimate = .405, *SE* = .078, *t* = 5.16, *p* < .001) to postverbal subjects, i.e., the VS order (NS: *M* = 3.47, *SD* = 1.37, *SE* = .365; HS: *M* = 3.6, *SD* = 1.24, *SE* = .22; L2: *M* = 3.75, *SD* = 1.24, *SE* = .27). Participants, however, showed no significant preference for preverbal or postverbal subjects with unaccusative verbs. There was no interaction between VERB TYPE, SUBJECT POSITION and GROUP, suggesting patterns of preference along the variables of VERB TYPE and SUBJECT POSITION are not significantly affected by GROUP.

3.3. Adverb position

Significant interactions between ADVERB POSITION and SUBJECT POSITION (Estimate = .204, *SE* = .078, *t* = 15.53, *p* < .0001), and ADVERB POSITION, SUBJECT POSITION and GROUP (Estimate = -.839, *SE* = .21, *t* = -4.01, p < .0001) suggest that, like in previous studies, adverb position affects word order preferences in a judgment task. I explore the three-way interaction with a post hoc pairwise comparison with Tukey adjustment and find the following significant comparisons: as expected, I find that the SVA order is rated higher than the VSA order on average across all groups (NS: Estimate = 1.19, *p* < .0001; HS: Estimate = .942, *p* <. 0001; Estimate = .762, *p* < .0001). Interestingly, with preverbal subjects, adjacency of adverb and subject is dispreferred: all groups preferred the SVA order over the ASV order (NS: Estimate = .446, *p* = .006; HS: Estimate = .508, *p* < .0001; L2: Estimate = .333, *p* = .02). With postverbal subjects, adverb-subject adjacency was also dispreferred: the AVS order was rated higher than the VSA order on average across all groups (NS: Estimate = 1.11, *p* < .0001; HS: Estimate = .88, *p* < .0001; L2: Estimate = .381, *p* = .003). I find an asymmetry between the adverb-subject adjacent conditions: all groups preferred the ASV order to the VSA order on average (NS: Estimate = .74, *p* < .0001; HS: Estimate = .435, *p* < .0001; L2: Estimate = .428, *p* < .001).

Order	Group	Mean	Standard deviation	Standard error of the mean
SVA	Native speakers	4.2	1.22	.326
	Heritage speakers	4.17	1.19	.211
	L2 speakers	4.4	1.02	.222
ASV	Native speakers	3.76	1.25	.335
	Heritage speakers	3.66	1.23	.218
	L2 speakers	4.07	1.21	.264
AVS	Native speakers	4.13	1.12	.299
	Heritage speakers	4.12	1.13	.2
	L2 speakers	4	1.18	.258
VSA	Native speakers	3.02	1.30	.349
	Heritage speakers	3.24	1.27	.225
	L2 speakers	3.62	1.29	.282

Table 3. Mean and standard deviation for each word order for each group

As expected, the VSA order was the least acceptable for all groups, which converges with previous studies that show that postverbal subjects may be licensed by preverbal adjuncts. I report the means and standard deviations of each order for each group in Table 3 above. Figure 5 shows mean word order ratings by group. I find no significant pairwise comparison difference between the same order across any two groups.
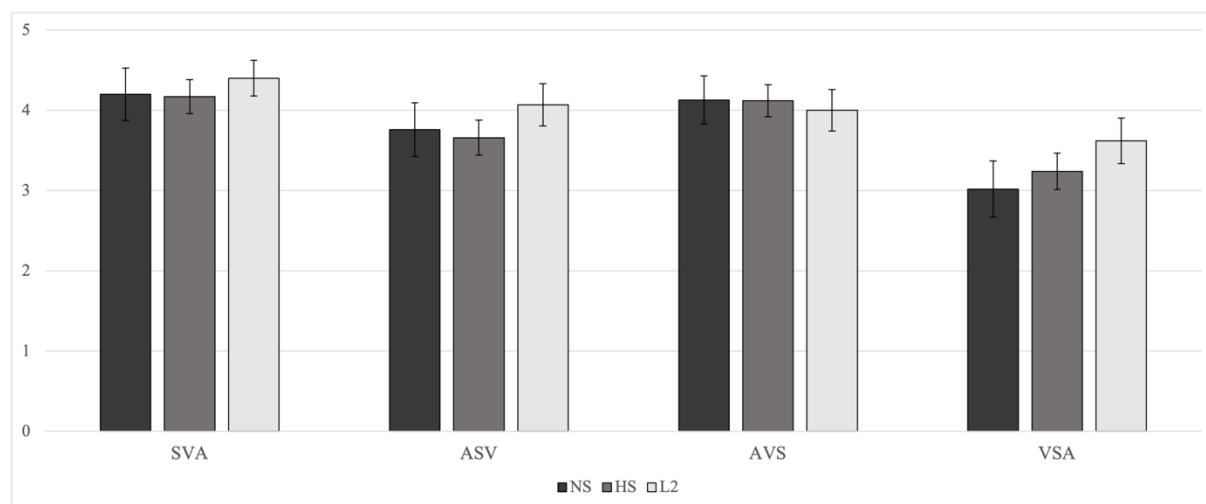
Figure 5. Mean rating by word order and group

4. Discussion

Regarding my first research question, i.e., whether intransitive verb type (unaccusative/unergative) affects word order preferences for monolingually-raised native, heritage and L2 Spanish speakers, I find that all groups are sensitive to this distinction: they

significantly prefer preverbal subjects over postverbal subjects with unergatives but show no such preference evidenced in this task for unaccusatives. In contrast with previous studies (e.g., Lozano 2006; Roggia 2011; De Prada Pérez &. Pascul y Cabo 2012; Nishida et al. 2020), in the present study, sentences were presented one at time. This allowed me to truly evaluate optionality as opposed to preference, viz. preferring SV over VS does not imply a rejection of the VS word order. In the present study, since speakers assigned similar ratings, on average, to SV and VS orders with unaccusatives, we can consider that both are available to the populations examined. With unergatives, however, I find statistically significant differences in ratings for SV versus VS: all speaker groups assigned higher ratings to SV than VS with unergatives. While some theoretical approaches suggest postverbal subjects are preferred over preverbal subjects with unaccusative verbs, my findings suggest that unaccusative verbs show optionality for subject position while unergative verbs do not. These results are in line with a corpus study on word order and verb type in CREA (Real Academia Española), in which Mayoral-Hernandez and Chen (2006) found that subject position was a reliable test for verb type, insofar as transitive verbs and unergative verbs show a strong statistical tendency for preverbal subjects while unaccusative verbs show no tendency either way.

It is pertinent to address frequency effects given these results: one could argue that HS and L2 speakers are mimicking what they hear, using preverbal subjects with unergative verbs and postverbal subjects with unaccusative verbs. If that is the case, we would expect VS to be rated highest with the highest frequency unaccusative verbs, assuming those are the verbs speakers will have heard in the VS order most often. With lower frequency unaccusative verbs, there is no input frequency-related reason for HS and L2 speakers to reset the subject position parameter, and we should see a generalization of SV to lower frequency unaccusative verbs. While frequency effects are beyond the scope of the current investigation, to address this question *post hoc* I consider the three highest frequency unaccusative verbs used: *llegar* 'arrive' (relative frequency 238.75), *volver* 'return' (relative frequency 120.09), and *crecer* 'grow' (relative frequency 26.47); and the three lowest frequency unaccusative verbs used, *reaparecer* 'reappear' (relative frequency 1.6), *resbalar* 'to slip' (relative frequency 4.26), and *caerse* 'fall' (relative frequency 4.8) (Guasch et al. 2013). Matched pairs T-tests for the high frequency versus low frequency unaccusative verbs in VS order with a Bonferroni correction by group reveal no significant effects of frequency for NS or HS. I obtain a low p-value ($p = .002$) for the L2 data by frequency, but not in the expected direction if L2 speakers are mimicking high frequency VS order verbs: L2 speakers rated the low frequency unaccusative verbs higher, on average, than the high frequency unaccusative verbs in the VS order. In opposition to a frequency effects explanation, I suggest that HS and L2 speakers have access to the deeper structural distinction between unaccusative and unergative verbs and its consequences on word order in Spanish, given that it is unlikely that they have heard many tokens of the lowest frequency unaccusatives in VS order yet still rate them relatively high, suggesting acceptance of this order.

I can also confirm that adverb position affects word order preferences in a judgment task for all three speaker groups, an interesting finding given that adverb position is also not often taught explicitly in the classroom, especially in reference how it interacts with the position of the grammatical subject. Incorrect adverb placement would not be a likely target for correction or explicit negative feedback in the language classroom. In line with Torrego (1989), Roggia (2011) and Nishida et al. (2020), I found that postverbal subjects were accepted at a higher rate on average with preverbal, or in this case, phrase-initial, adverbs. This may be due to information structure movement: while we cannot draw definitive conclusions on the inner processes of participants' minds during the task, it is plausible that speakers analyzed the phrase-initial adverb as a topic, which would license a postverbal subject for both verb types

given that non-pronominal preverbal subjects in Spanish are thought to be analyzed as topics (Alonso-Ovalle et al. 2002). Further, subject-adverb adjacency was penalized with preverbal subjects for all speaker groups: the SVA order was preferred over the ASV order. This result is in line with the idea that preverbal subjects may compete with adjuncts for the same leftmost topic position (Zubizarreta 1998).

4.1 Conclusion and future directions

The findings of my study suggest that, like monolingually-raised native speakers, heritage speakers, and L2 speakers are sensitive to the subtle semantic distinction between unaccusative and unergative verbs in Spanish. These findings lend support to the Unaccusative Hypothesis (Perlmutter 1978), which distinguishes structurally between these two verb types: given that my acceptability judgment task was decontextualized, it is plausible that this structural distinction is where the licensing of postverbal subjects with unaccusative verbs in this task lies. The results in my study suggest that NS, HS and L2 speakers are sensitive to this subtle distinction which is not taught in the classroom. Further, like NS, HS and L2 speakers are sensitive to the position of adjuncts, specifically adverbs, and its effects on subject-verb word order in Spanish. These findings pose an interesting question for learnability: though neither verb type word order alternations nor adverb placement are typically taught in the classroom, and given that postverbal subjects are not available in the majority language and L1 of the HS and L2 speakers respectively, I argue that HS and L2 speakers are attuned to this universal distinction (unaccusative/unergative) and subtle structural differences with adverb placement even as adults.

Acknowledgements

Abbreviations

3SG	third person singular	INF	infinitive
3PL	third person plural	M	masculine
ABS	absolutive	PRS	present tense
AUX	auxiliary	PST	past tense
F	feminine	PTCP	participle
FOC	focus		

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Effects of neighboring creaky tone on low tone of Burmese
in post-lexical context

Su Paing Swe

In this paper, I investigated the behaviors of neighboring creaky tone of Burmese, in relation to the low tone which has been regarded as the one likely to have effects from the other tones. As high tone of Burmese has already been observed as having a carry-over effect into a following low or high tone, I claim that the high-pitched creaky tone can affect a following low tone. Therefore, through measurements of F0 with sentences uttered by four native speakers, I analyzed preceding and following effects of creaky tone on low tone.

1. Introduction
1.1. Burmese and its tones

Burmese is a member of the Sino-Tibetan language family belonging to the Burmish sub-branch of the Lolo-Burmese branch of the Tibeto-Burman family. It is phonologically a tonal language with distinct features of phonation from the other languages of the same family. Its syllable structure consists of an initial consonant, a vowel and an optional final consonant which is usually N (nasal consonant) or O (obstruent consonant) (see Table 1). The syllable type of the checked tone is always CVO, and the final obstruent consonant is mentioned with the glottal coda symbol /ʔ/.

Syllable types of Burmese (Green 2002)	Tones of Burmese (Wheatley 1987)
CV /mè/ ‘girl’	Low /kʰà/ ‘shake’
CVC /mɛʔ/ ‘crave’	High /kʰá/ ‘be bitter’
CGV /mjè/ ‘ earth’	Creaky /kʰa̰/ ‘to attend on’
CGVC /mjɛʔ/ ‘eye’	Checked[1] /kʰaʔ/ ‘to beat’
CVVC /màuN/ ‘address for young men’	
CGVVC /mjáuN/ ‘ditch’	

Table 1: Examples of Burmese syllables and tones

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[1] Checked tone of Burmese is also called ‘killed’ tone or ‘stopped’ tone in some studies (Watkins 2005; Kelly 2013).

Most of the previous studies on Burmese tone measured fundamental frequency (F0), duration, intensity, voice quality, vowel quality or spectral tilts to find out the distinguishing factors between the four lexical tones. General phonetic differences and qualities between these four Burmese tones, according to previous studies mainly done by Bradley (1982), Wheatley (1987) and Watkins (2001) can be found in Table 2.

Tones	Duration	Intensity	Pitch	Phonation
Low	long, moderate	low	low	breathy or plain
High	long	moderate	high rise or fall	plain, modal
Creaky	short	high	high, sharp fall	creaky, weak glottal closure
Checked	extremely short	highest	initial high, fall	abrupt, complete glottal closure

Table 2: General phonetic differences and qualities of the four Burmese lexical tones

The high tone has also been called the 'longest' tone (Bradley 1982; Watkins 1997), and the 'heavy' tone (Bradley 1982). However, the high pitch of the high tone is often attested as lower than the creaky or checked (killed) tones. Its fundamental frequency (F0) was described as having a higher peak than the low tone (Bradley 1982; Wheatley 1987; Jenks 2007).

The low tone has been described as a tone with low pitch and a slight fall (Richter 1967), and labeled as an "even" tone by Bradley (1982). Watkins (2005) showed that the low tone has its peak F0 at the onset of the vowel. According to Gruber (2011) who analyzed all the Burmese four lexical tones, low tone syllables are moderately long with regular glottal vibration. A recent study on the induced creaky tone[2] by Tian (2018) mentioned that low tone in Burmese could be induced to change into creaky tone as low tone syllables are much more susceptible than high tone syllables to change into induced creaky tone. The reason why that change happens with low tone is because, according to the underlying representations of Burmese tones suggested by Gruber (2011), low tone can be induced to form the creaky tone as the former does not have any [+high] features while the other three tones do.

The creaky tone was observed as "slightly" falling in comparison to the high tone (Bradley 1982), as the tone which falls "more sharply than the high tone" (Okell 1969) and as marked both by glottal stricture during the vowel, a final glottal stop, and high pitch which occurs early (Thurgood 1976). Ladefoged et al. (1988) described the Burmese creaky voice as the tone where the larynx 'becomes increasingly tense' over the duration of the vowel. Gruber (2011) found that the creaky phonation of the creaky tone is often lost in speech, according to his results using electroglottograph (EGG). He also stated that the pitches of the creaky and checked tones fall abruptly in phrase final position, but gradually in phrase medial position.

Even though the checked tone is frequently mentioned along with creaky tone as having similar F0 contour patterns, it is considered a lexical tone as well as a checked syllable in some previous studies (Bernot 1963; Bradley 1982; Yip 1995) because of its surface syllable structure with the glottal coda /ʔ/, which is its most distinctive feature in comparison to the other three tones. It was excluded here as it falls outside the scope of the current study.

According to Tian (2018), a neutral tone (or a toneless syllable), which can only be found with schwa /ə/, can also be added to the tonal categories of Burmese. Neutral tone only cooccurs with an open and unstressed syllable surrounded by the other major syllables. However, the

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[2] Induced creaky tone is a grammatical tone which is the same with creaky tone, formed from which low or high tone is changed, a tonal alternation phenomenon in Burmese (Tian 2018).

neutral tone is not considered and discussed in this paper as it has been attested as tonally non-contrastive (Watkins 2001).

1.2. F0 and Burmese tones

According to the study of Gruber (2011), it was observed that a preceding high tone shows a carry-over effect into a following low or high tone by elevating F0 at their onset. Moreover, low tones were also found with a flat contour at a comparatively low F0, and elevated pitch was found only where they are in transition from the syllable onset, initially following a high tone syllable.

In the study of Kelly (2013), the onset F0 of low and high tones was lower than that of creaky and checked tones, and the offset F0 and peak F0 of low tones were lower than those of high tones.

The creaky tone was described mostly as being different from the high and low tone because it normally has a higher F0 at its onset and a pitch contour that starts high and falls at the midpoint, but with a shorter duration than low or high tones. However, according to Gruber (2011), creaky tone has a higher offset F0 and longer duration in phrase medial position than phrase final position or isolation.

1.3. Effects of context on F0

According to Gruber (2011), even though surrounding words bearing creaky tone were not used in his study, it was discussed that co-articulation between adjacent tones in Burmese was more likely to be perseverative than anticipatory, meaning that effects of preceding tones are more prominent than those of following tones. Moreover, Gruber (2011) also mentions that low and high tone syllables are more dependent on the surrounding context as they do not show early pitch targets like creaky and checked tones.

As the effect of high tone on low tone has been studied, the focus of this study is to find out, by measuring F0, the behavior of the low tone of Burmese when it is preceded and followed by the creaky tone which also has high pitch like the high tone. It is also to check if co-articulation between adjacent tones is more likely to be perseverative than anticipatory when they are neighbored by creaky tone.

2. Hypotheses and method
2.1. Hypotheses

In order to find out the effects of creaky tone on low tone, a set of hypotheses which tests the preceding and following effects of creaky tone, was structured as given below.
H1. Neighboring creaky tone shows effects on the target low tone.
H1.1   Creaky tone shows preceding effect on low tone.
H1.2   Creaky tone shows following effect on low tone.

2.2. Materials

The materials of this study consist of 160 tokens structured with 9 trisyllabic combinations (as in Table 3) which are composed of 2 low tone syllables *mà* and *nà* surrounded by 2 different contexts *má_la̰* and *lá_ ma̰* carrying high and creaky tones. Each of the 2 repeated combinations *nà nà nà* and *mà mà mà* in each of the two contexts were deleted and the six low tone syllables, which were used to form the combinations, were recorded separately. Therefore, 40 tokens were recorded by each participant. The combinations with high tone and low tone were included to ensure that results would be comparable even though the effects of high tone can be predicted to be high (Gruber 2011) and the low tone is not known for having an influence on its neighboring tones according to most of the previous studies where it was frequently used in carrier phrases for its neutral property.

Preceding and following tones	H (High tone)	L (Low tone)	C (Creaky tone)
H (High tone)	HLH	HLL	HLC
L (Low tone)	LLH	LLL	LLC
C (Creaky tone)	CLH	CLL	CLC

Table 3: 9 combinations of target low tone syllable with neighboring tones

All these combinations were put in the middle position of one sentence frame which consists of eleven syllables, making 9 utterances. No filler sentences were included as the target syllables and conditions were controlled to be only in one frame meaning 'It's not right that his/her name is (stimuli combination)'. However, the meanings of these sentences were not very natural to the participants as the embedded stimuli tokens were composed according to the tonal properties and not lexically. Example of HLL combination (1), that of CLL (2), that of LLH (3) and that of LLC (4) are as in below.

(1) θṵ   nàmɛ̀   **Mánànà**   sʰòdà   mə   houʔ pʰú
     3SG.POSS   name   NAME   REAL   NEG   right NEG
     'It's not right that his/her name is Manana.'

(2) θṵ   nàmɛ̀   **Ma̰nànà**   sʰòdà   mə   houʔ pʰú
     3SG.POSS   name   NAME   REAL   NEG   right NEG
     'It's not right that his/her name is Manana.'

(3) θṵ   nàmɛ̀   **Màmàlá**   sʰòdà   mə   houʔ pʰú
     3SG.POSS   name   NAME   REAL   NEG   right NEG
     'It's not right that his/her name is Mamala.'

(4) θṵ   nàmɛ̀   **Màmàla̰**   sʰòdà   mə   houʔ pʰú
     3SG.POSS   name   NAME   REAL   NEG   right NEG
     'It's not right that his/her name is Mamala.'

The lexical category of the two tested low tone syllables *mà* and *nà* is varied: it can be either noun or adjective or verb or adverb or even particle. That of the neighboring tones also are varied. However, the tonal properties of a Burmese word normally have no relation with its semantic meaning and the combinations with three lexical tones like *má nà nà* (HLL), *nà nà lạ* (LLC) do not carry any meaning.

The controlled factors in the two target low tone syllables and their neighboring syllables are the vowel, the syllable structure, and the consonants. Only the vowel /a/, which is a common vowel in Burmese, was used for the target low tone. Most of the previous studies on Burmese tones (Thein Tun 1982; Gruber 2011; Kelly 2013) used that vowel in stimuli tokens. As for the syllable structures of the target low tone words and the neighboring words, only the open syllable type CV was used to ensure consistent data when the results of the target low tone syllables were compared to each other. Moreover, the consonants used in the target low tone syllables and the neighboring syllables were chosen to be only voiced sonorants (nasals and liquids) in order to avoid obstruction of the vocal tract which would make measuring F0 more difficult.

2.3. Participants

All the 160 stimuli tokens were read out by four female native speakers. The reason for using only female participants is to measure the utterances with the same pitch range (75–500 Hz). General information on the four participants can be found in Table 4. According to their regions, their tonal contrast is assumed not to deviate from standard Burmese.

Participants	Age range	Regions	Native language	Foreign languages
1	30–40	Yangon	Burmese	English, French
2	40–50	Yangon	Burmese	English, French
3	60–70	Mandalay	Burmese	English
4	30–35	Yangon	Burmese	English, French

Table 4: Participants' data

2.4. Procedure

All 9 stimuli sentences and six isolated syllables were recorded in .wav format at 44.1kHz in a silent room. The tested stimuli sentences were presented in a randomized order including repetitions, and the participants were asked to read them at a normal speaking rate. After recording, the data was analyzed in the program Praat (version 6.1.16) (Boersma & Weenink 2020).

To analyze the target low tone syllables in Praat, the target tone and the neighboring syllables (for example: HLH or CLC) of each recorded utterance were segmented manually. F0 values were extracted automatically from the segmented sound files using a Praat script (Washington 2018).

2.5. Measurements

In this paper, the mean F0 of the target low tone syllables was used to find out the neighboring effect of creaky tone on low tone. The normalized mean F0 values of target low tone syllables in isolation and in post-lexical context were compared first, then target low tone syllables with neighboring combinations were compared each other, and F0 contours (F0 start and F0 end) were compared to figure out the preceding and following effects of creaky tone on low tone.

3. Findings
3.1. Mean F0 values of low tone syllables in isolation and in all combinations

After normalizing the F0 values of all four participants, mean F0 values of the low tone syllables in isolation and in combinations were calculated to test the hypothesis H1. As seen in Figure 1 below, in the preceding context, the mean F0 values of the low tone syllable *nà* of HLH, HLL, and HLC combinations are higher than those of the other combinations, and those of CLH, CLL, and CLC are the lowest. In the following context, the mean F0 value of the low tone syllable of HLH is the highest and that of CLH is the lowest. Among the preceding high and creaky tone combinations, the value of the HLC is the lowest in comparison with those of HLH and HLL, but that of CLC is the highest if compared with those of CLH, and CLL. The values of LLH and LLC combinations are not much different from that of LLL combination.

However, there are some differences between the mean F0 values of the low tone syllable *nà* and those of *mà*. As seen in Figure 2, the mean F0 values of the low tone syllable *mà* of HLH, HLL, and HLC are still higher than those of the low tone syllable of CLH, CLL and CLC, but not as high as that of LLL. The values of the following creaky tone combinations such as LLC and HLC are the lowest in comparison with those of their counterparts. However, as in the data with the low tone syllable *nà*, the value of CLC is the highest of its preceding creaky combinations.
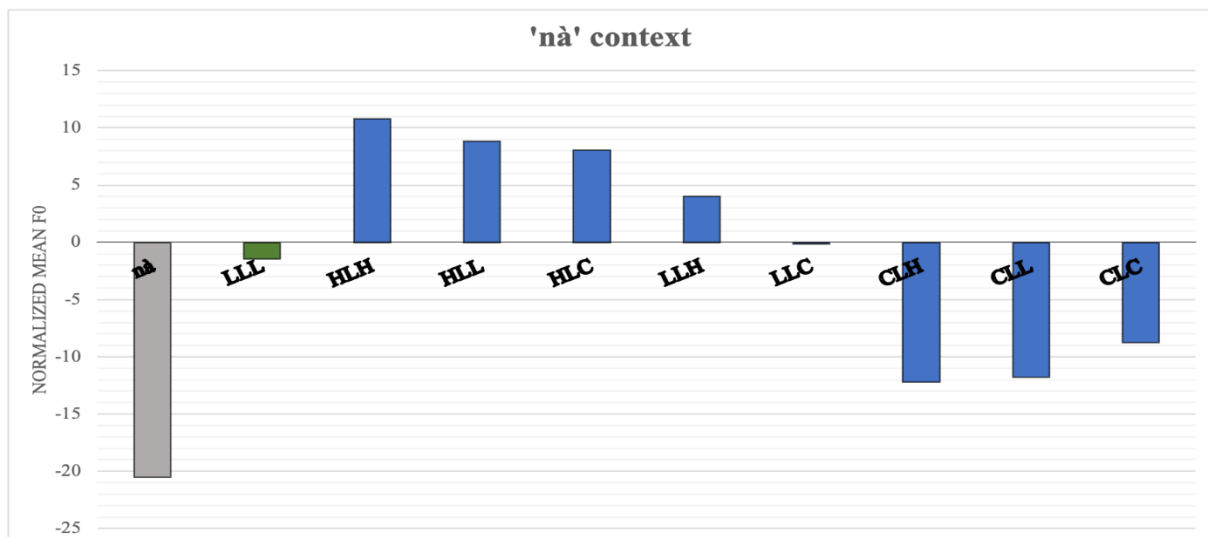

Figure 1: Normalized mean F0 values of isolated low tone syllable nà *in comparison with those of the low tone syllable of all the 9 combinations*
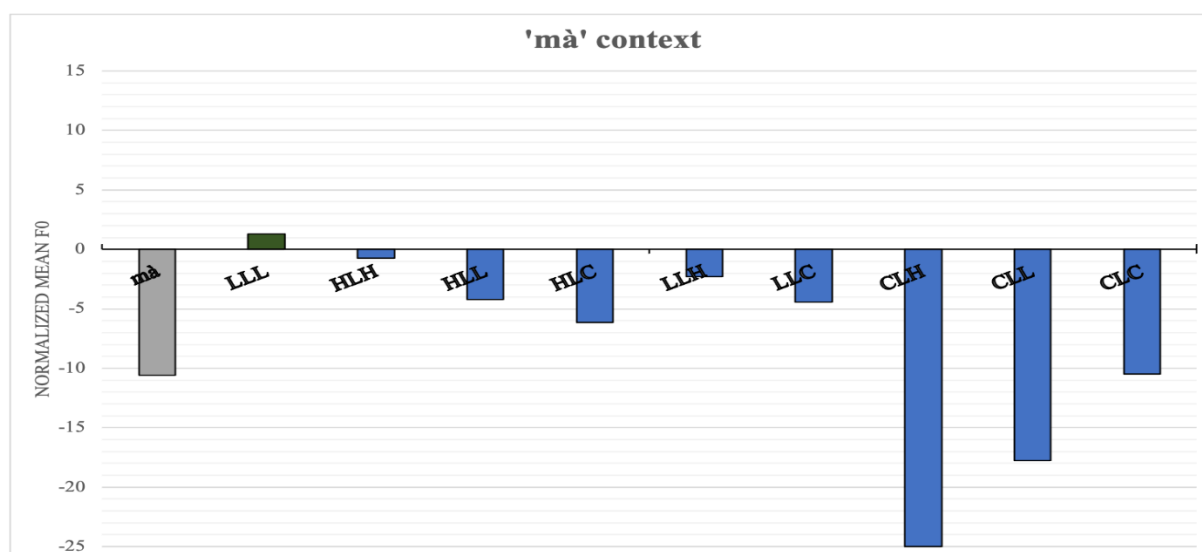
Figure 2: Normalized mean F0 values of isolated low tone syllable mà *in comparison with those of the low tone syllable of all the 9 combinations*

3.2. Mean F0 values of the low tone syllables in different contexts

In this section, the mean F0 values of the low tone syllables *nà* and *mà* of preceding and following high, low, and creaky tones were calculated to test hypotheses H1.1 and H1.2. As seen in Figure 3 below, it was found that the isolated low tone syllable *nà* has a lower mean F0 compared to that of LLL. As for the effect of preceding tone, the mean F0 values of the low tone syllable *nà* in the CLL combination of *ma̰ _ nà* context and the *la̰ _nà* context were lower than those of the low tone syllable *nà* of the HLL combinations and that of the LLL combination respectively. As for the effect of following tone, the mean F0 values of the low tone syllable *nà* in the LLC combinations of the *nà_ma̰* and the *nà _la̰* contexts were lower than those of the low tone syllable of the LLH combinations of *nà_ má* and *nà_lá* contexts, but not obviously. The values of LLC combinations were not much different from that of the low tone syllable of LLL either.

As seen in Figure 4 below, it was found that the isolated low tone syllable *m*à has a lower mean F0 compared to that of LLL. As for the effect of preceding tone, the mean F0 values of the low tone syllable *mà* in the CLL combinations in *ma̰ _ mà* and the *la̰ _ mà* contexts were lower than those of the low tone syllable of the HLL combinations and that of LLL respectively. As for the effect of following tone, the mean F0 values of the low tone syllable *mà* of the LLC combinations of the *mà_ma̰* and the *mà _la̰* contexts were lower than those of the low tone syllable of the LLH combinations of *mà_ má* and *mà_lá* contexts and that of the low tone syllable of LLL, but not obviously.
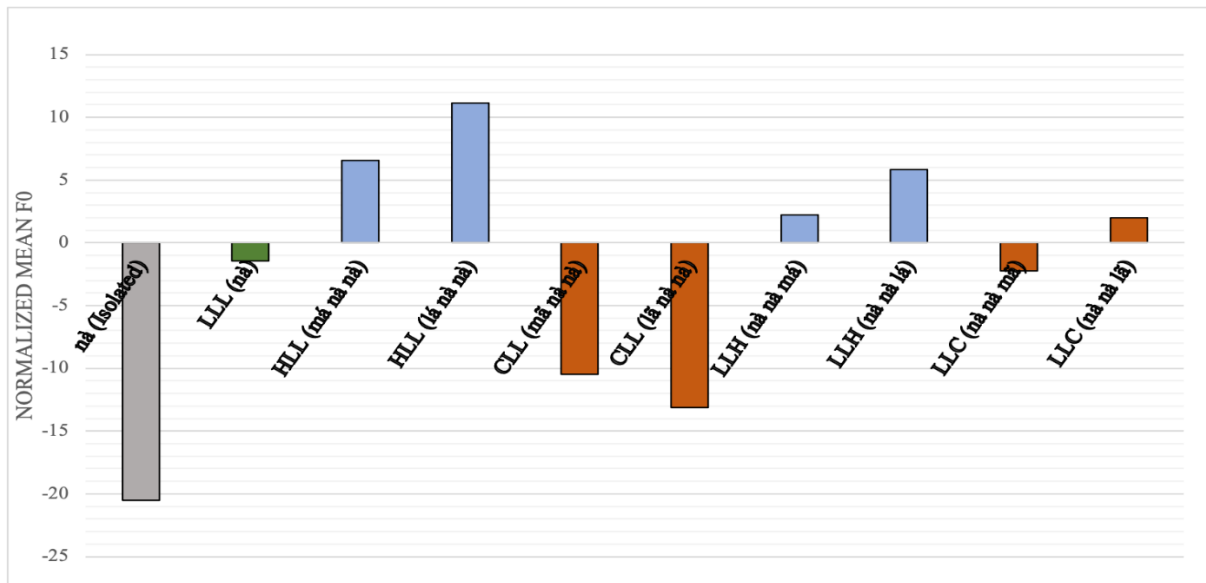
Figure 3: Normalized mean F0 values of low tone syllable nà *with preceding and following high, low, and creaky tones in comparison to that of isolated low tone syllable[3]*
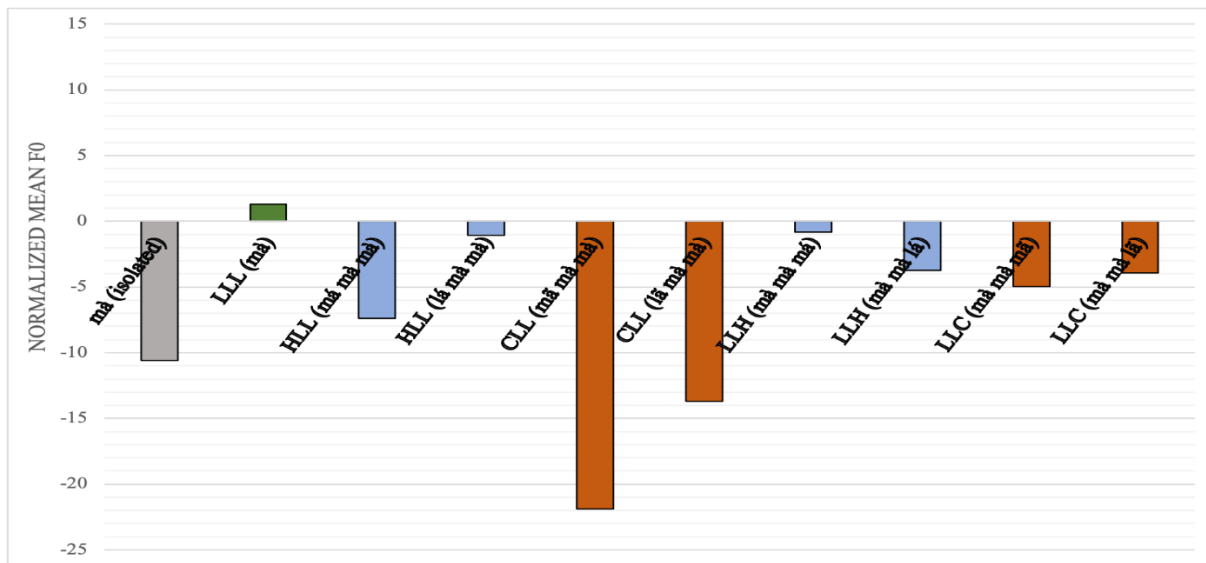
Figure 4: Normalized mean F0 values of low tone syllable mà *with preceding and following high, low, and creaky tones in comparison to that of isolated low tone syllable*

3.3. Effects of neighboring creaky tone on F0 start and end values of low tone syllables

For this section, the normalized F0 start and end values of the isolated low tone syllables *mà* and *nà*, and those of the preceding and following high, creaky and low tone combinations were figured out, in order to observe the effects of creaky tone on low tone more closely. According to Figures 5–15, it can be easily seen that the F0 start and end values of the isolated low tone

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[3] Because of font problems for the words with diacritics in the Microsoft Excel, the syllables bearing creaky tone was written as *lã, mã* in the figures.

syllables *mà* and *nà* are quite different from those of the post-lexical contexts depending on the preceding syllables. Firstly, as for the *nà* context, it was found that, in the HLL combination (see Figure 6), the F0 start value of the target low tone syllable was higher than the F0 end value of the preceding high tone syllable, but in the CLL combination, it was the opposite (see Figure 8). In the other combinations such as LLH, LLC and LLL, the F0 values of the target low tone syllables were quite similar as their F0 start values were not much different from the preceding low tone syllables, which were not as high as the high and creaky tone syllables (see Figures 10, 12, and 14).

Secondly, as for the *mà* context, most of the results were similar to the *nà* context: the F0 start values of the target low tone syllable were as low as their preceding low tone syllables in the LLH, LLC and LLL combinations (see Figures 11, 13, and 15). The F0 start value of the target low tone syllable was also higher than the F0 end value of the preceding high tone syllable, as in the *nà* context (see Figure 7). However, in the CLL combination, the F0 start value of the target low tone syllable was higher than the F0 end value of the preceding creaky tone syllable (see Figure 9).
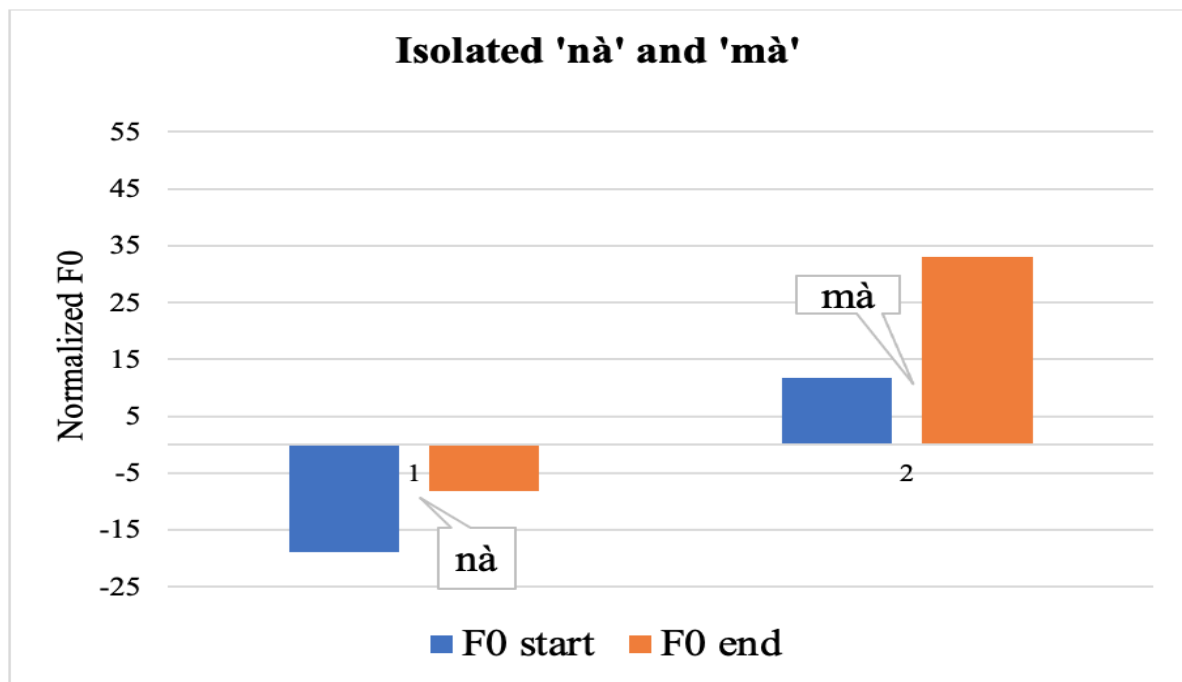
Figure 5: Normalized F0 start and end values of isolated low tone syllables nà *and* mà
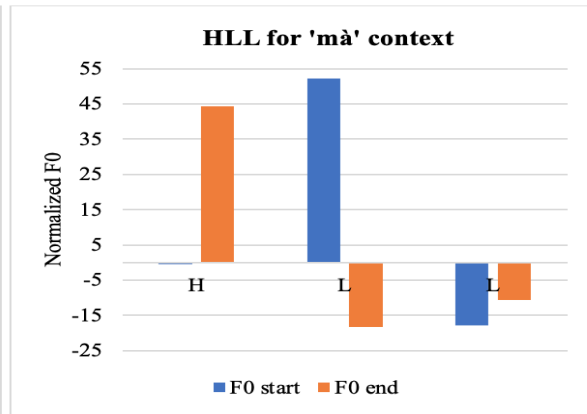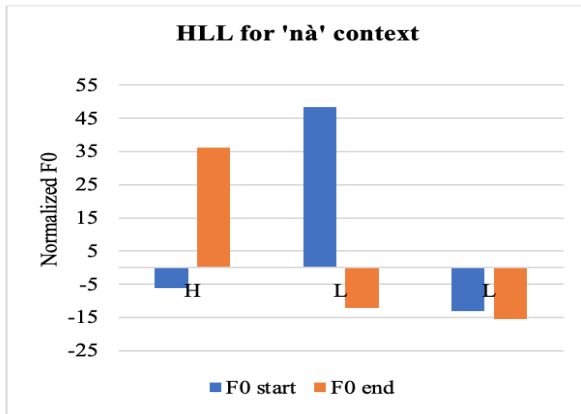
Figures 6 and 7: Normalized F0 start and end values of low tone syllables nà *and* mà *of HLL combinations*
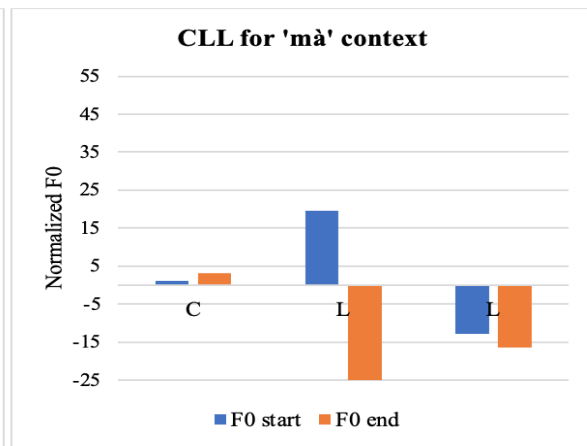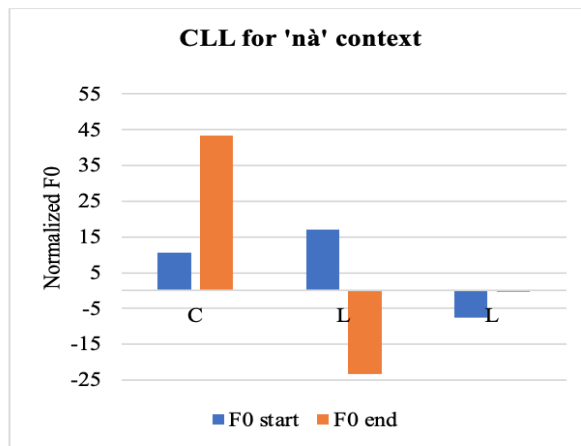
Figures 8 and 9: Normalized F0 start and end values of low tone syllables nà *and* mà *of CLL combinations*
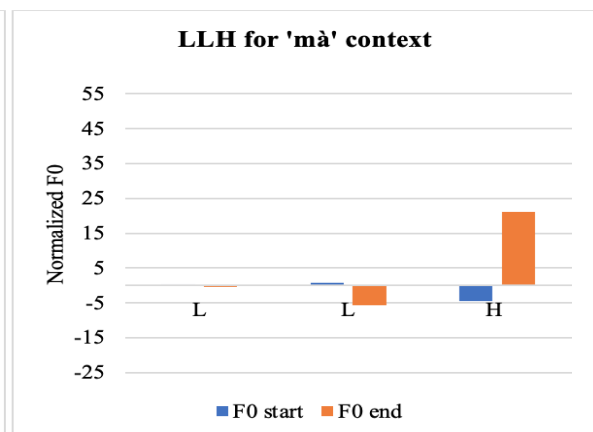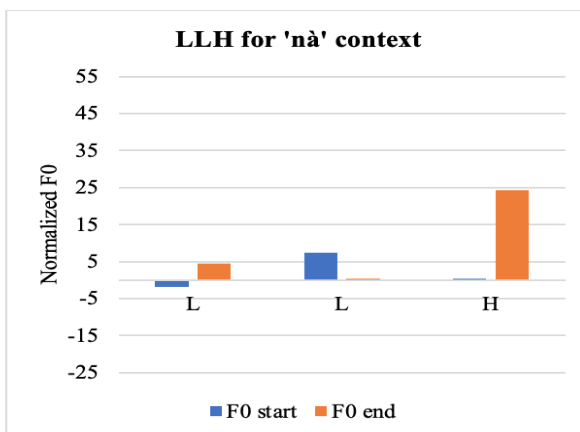
Figures 10 and 11: Normalized F0 start and end values of low tone syllables nà *and* mà *of LLH combinations*
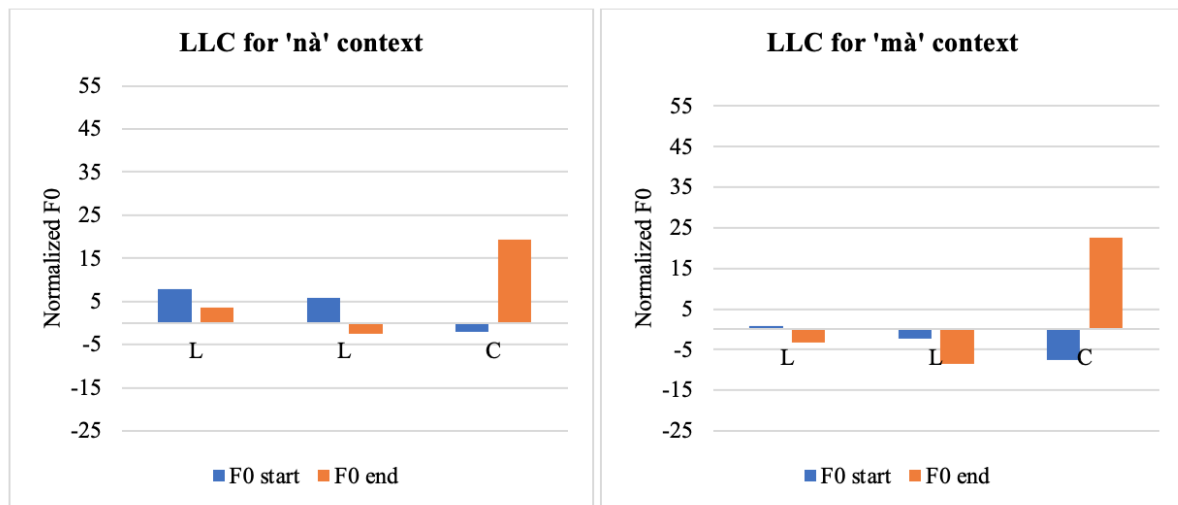
Figures 12 and 13: Normalized F0 start and end values of low tone syllables nà *and* mà *of LLC combinations*
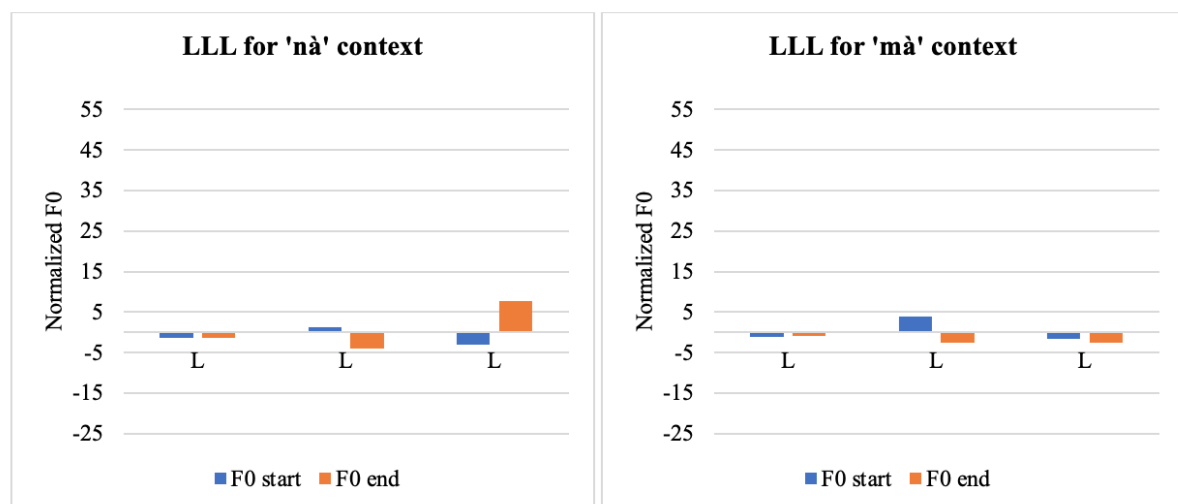
Figures 14 and 15: Normalized F0 start and end values of low tone syllables 'nà' and 'mà' of LLL combinations

4. Discussion

Low tone syllables in the post-lexical context were found to behave differently depending on the neighboring tones.

Firstly, the findings from the Section 3.1 (see Figures 1 and 2) confirm that neighboring creaky tone shows effects on target low tone, because the mean F0 values of the isolated low tone syllables *mà* and *nà* were found to be different from those in post-lexical contexts. Also, in both contexts *mà* and *nà*, the F0 values of the preceding creaky tone combinations (CLH, CLL, CLC) were found to be lowest in comparison to those of the other preceding high and low tone combinations (HLH, HLL, HLC, LLH, LLL, LLC). However, the data of the following creaky tone combinations were not consistent because the mean F0 value of HLC

was the lowest compared with those of HLL and HLH, but that of CLC was found to be higher than those of CLL and CLH.

Secondly, the findings from Section 3.2 (see Figures 3 and 4) show how target low tone syllables are influenced by neighboring creaky tone. As for the effect of preceding tone, the mean F0 values of the CLL combinations were always found to be lower than those of the other preceding combinations HLL and LLL, in both of the two contexts *mà* and *nà*, suggesting that the target low tone syllable undergoes lowering effects from preceding creaky tone. As for the effect of following tone, the findings related to LLC were not consistent as it was found that the mean F0 values of LLC were lower than those of LLH but higher than those of LLL in *nà* context.

Thirdly, the findings related with F0 start and end values from Section 3.3 (see Figures 5–15) confirm the hypotheses H1 and H1.1 of this study. The results show that F0 start values of isolated syllables were lower than their F0 end values, but the opposite thing was found with the F0 start and end values of low tone syllables in post-lexical context. The F0 start and end values from HLL and CLL combinations (see Figures 6–9) suggested that target low tone syllables have high F0 start values when preceded by high tone, and they have only slightly high F0 start values when preceded by creaky tone. The similar patterns of LLH, LLC and LLL (see Figures 10–15), from both contexts *nà* and *mà*, also show that the F0 start values of the target low tone syllables are not much different from the F0 end values of the preceding low tone syllables no matter whether they were followed by high or low or creaky tone. These results confirm the hypotheses that neighboring creaky tone shows effects on target low tone and preceding (but not following) creaky tone influences the realization of low tone. That is why only the hypotheses H1 and H1.1 of this study are confirmed.

In the study of Gruber (2011) where the combinations of four lexical tone syllables with the vowel /a/ in the low_low, high_low and low_high contexts were tested to analyze the onset and offset F0 of the vowel in different situations, it was already found that a preceding high tone could have carry-over effect into the embedded low or high syllable by elevating F0 at their onsets, but a following high tone had little to no influence on the pitch of the prior syllable. Even though the effects of creaky tone on low tone were not mentioned in that study, it was discussed that co-articulation between adjacent tones in Burmese were more likely to be perseverative than anticipatory, meaning that the effects of preceding tones are more prominent than those of following tones. In this study also, the effect of following creaky tone on low tone cannot be shown from the data. As such, the hypothesis H1.2 is not confirmed.

5. Conclusion

Even though this is a preliminary study for future studies on Burmese neighboring tone interactions in post-lexical context, different behaviors of Burmese low tone when neighbored by the three lexical tones can be found to some extent. The influences of all the three lexical tones on the low tone were carefully figured out by the preceding context, the following context, the comparison between the mean F0 values of all the combinations and those of the isolated low tone syllables in this study.

This study focused only on phrase-medial position of target low tone syllables and combinations as there might be some findings in relation to those on the phrase-final positions and quotations in the previous studies of Burmese. No statistical inquiry was used in this study as the predictions for hypotheses were drawn from previous findings (Thein Tun 1982; Gruber

2011; Kelly 2013) where the behaviors of all the four lexical tones of Burmese were well distinguished and classified, careful observation such as controlled factors in structuring stimuli sentences and precise measurements like normalized F0 values were also carried out to get the results.

As there have not been many prior studies on the effects of neighboring tones on Burmese, the discussions and analyses do not show the full picture. However, I hope that this study can provide relevant information on the neighboring effects of creaky tone on low tone of Burmese and open further study areas for Burmese tones.

Acknowledgements

Abbreviations

3SG	third person singular
NAME	name
NEG	negation
POSS	possessive
REAL	realis

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What directionality diagnostics can tell us about the formation of zero-nominals in German

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This paper addresses German zero-nominals such as (*der*) *Lauf* '(the) run' (↔ *laufen* 'to run'), whose theoretical modeling is challenging in the absence of morphological marking. Assuming that directionality diagnostics can be used to provide evidence in favor either of derivational theories (Marchand 1963a, 1964; Kiparsky 1982) or of underspecification accounts (Farrell 2001; Borer 2013), a self-collected data set of 60 German verb-noun pairs is investigated on the basis of five diagnostics. The results indicate that most zero-nominals are zero-derived from verbal bases, which largely supports a directional derivational analysis. A non-directional analysis is motivated for those word pairs where no derivational direction can be identified.

1.   Introduction

This paper addresses German zero-nominals (henceforth ZNs) such as (*der*) *Lauf* '(the) run' or (*der*) *Dreh* '(the) spin' in (1), which are semantically and morphologically related to verbs but which, in contrast to deverbal suffix-based nominalizations, do not display an overt derivational marking.

(1) a.   lauf-en 'to run'   –   der Lauf-**Ø** 'the run'   –   die Lauf-**erei** 'the running around'
    b.   dreh-en 'to spin'   –   der Dreh-**Ø** 'the spin'   –   die Dreh-**ung** 'the twist'

ZNs are of particular interest because they challenge the form-meaning isomorphism in linguistic analysis. This can be clearly seen if we look at English ZNs such as (*the*) *walk* or (*the*) *break* in (2).

(2) a.   to walk   –   the walk-**Ø**   –   the walk-**ing**
    b.   to break   –   the break-**Ø**   –   the break-**age**

One form (e.g. *walk* in (2a)) corresponds to two related, but slightly different meanings: a verbal

interpretation ('to move about on foot') and a nominal one ('an act or spell of walking or going on foot from place to place'; OED – Oxford English Dictionary Online 2021).[1] In contrast, suffix-based nominalizations conform to the form-meaning isomorphism, since the difference in meaning and lexical category between verb and noun is marked by a derivational affix on the nominal (*-ing* in (2a) and *-age* in (2b)).

Given the absence of morphological marking we find with ZNs, the question that arises is how to theoretically model these nominals. For our example in (2a), the question is as follows: is the noun (*the*) *walk* derived from the corresponding verb by means of a zero-suffix, similarly to (*the*) *walking*? Or is *walk* an underspecified form whose lexical category gets specified only in the syntactic context, i.e. it becomes a verb in the context of a tense marker like *-ed*, for instance, and a noun in the context of a determiner like *the*? In the literature, two families of theories can be distinguished: underspecification theories and derivational theories. Underspecification theories (Farrell 2001; Borer 2013) hypothesize that category-neutral forms get a verbal or a nominal interpretation depending on the linguistic context in which they are used (see also Section 5). For instance, Borer (2013) argues that a root like WALK is categorized either as a noun or as a verb in corresponding structures defined by functors such as Determiner (D) or Tense (T), as illustrated in (3a) and (3b).

(3) a. $[D [_{C=N} \sqrt{\text{WALK}}]]$
    b. $[T [_{C=V} \sqrt{\text{WALK}}]]$ (Borer 2013:324)

Derivational theories (Marchand 1963a, 1964; Kiparsky 1982), on the other hand, hypothesize that in the process of zero-derivation or conversion, category-specific forms are transferred to another lexical category. In Distributed Morphology (e.g. Halle & Marantz 1993; Harley 2009; Marantz 2013), for instance, it is assumed that roots are categorized when they merge with a functional head (e.g. little *n*, little *v*) and that the resulting word can be recategorized by merging with another functional head. For our example in (2a), such an analysis would predict that the root WALK is first categorized by a zero verbalizer and the verb is then nominalized by a zero nominalizer, as illustrated in (4).

(4) $[_{nP} \varnothing_n [_{vP} \varnothing_v [\sqrt{\text{WALK}}]]]$

One of the differences between underspecification and derivational theories with regard to the modeling of ZNs is related to directionality. In derivational theories, zero-derivation is considered to be a directional process, turning a word with a particular lexical category (the base) into a word with a different lexical category (the derived word). In (4), for instance, a derivational direction from verb to noun (V-to-N) is posited. Underspecification theories, on the other hand, do not assume that the verbal and the nominal use of a form like *walk* are related by a directional process. Borer (2013) hypothesizes that both words are directly built from the same root, as illustrated in (3) (see also Section 5). For the modeling of ZNs, this can be taken to indicate that, whenever we can identify the derivational direction in a zero-related word pair, a directional

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[1] Note that not all ZNs are formally identical with their related verb: some English ZNs have a different stress pattern than their related verbs, as in *to tormént – the tórmènt* (Kiparsky 1982:140). German ZNs do not have the ending *-en* that the infinitive of their related verb has (see (1)) and sometimes display phonological changes compared to the infinitive, e.g. ablaut (*reiten* 'to ride' – *der Ritt* 'the ride') or umlaut (*der Kampf* 'the fight' – *kämpfen* 'to fight') (see also Section 2). However, ZNs do not involve an overt suffix, they are 'derivationally unmarked' (Marchand 1964:11).

derivational analysis is supported, where one form is assumed to be basic and the other one derived. In order to identify the derivational direction (if any) in zero-related word pairs, several diagnostics have been proposed in the literature (Marchand 1964; Plag 2003; Plank 2010; Fleischer & Barz 2012; Lohmann 2017). These diagnostics concern the date when the words were recorded for the first time, the frequency with which they are used, the semantic relationship between them, and various formal properties at the phonological, morphological and syntactic level. However, previous research (Vogel 1996; Plag 2003; Bram 2011) has also established that the available directionality diagnostics do not yield a clear result for each word pair. If no derivational direction can be determined, an underspecification analysis seems more plausible, where both forms are considered to be built from a category-neutral root.

Starting from the above assumption that directionality diagnostics can be used to provide empirical evidence in favor either of underspecification theories or of derivational ones with respect to the modeling of ZNs, the present study examines a self-collected data set of 60 German zero-related verb-noun pairs. Recent research in the field of conversion or zero-derivation in present-day German has been mostly concerned with various properties, functions and basic problems of this type of word formation. Directionality, however, has only been briefly addressed and illustrated with a few examples in previous studies (Vogel 1996; Wiese 2002; Nolda 2013). Up to now, there has been no detailed investigation focusing on this topic and examining more than a few examples. The present study seeks to address this gap. Its objectives are (i) to assess the usefulness of five directionality diagnostics in identifying the derivational direction (if any) in German zero-related verb-noun pairs; (ii) to find out which pairs show directionality according to these diagnostics; and (iii) to investigate what the directionality results imply for the theoretical modeling of German ZNs. The directionality diagnostics listed in (5) will be applied to the data set.

(5) a. Date of First Attestation (Marchand 1963b; Vogel 1996; Plag 2003)
    b. Frequency of Occurrence (Marchand 1963a; Plag 2003; Fleischer & Barz 2012)
    c. Semantic Dependency (Marchand 1963b; Vogel 1996; Plag 2003; Plank 2010)
    d. Inflectional Behaviour (Plag 2003)
    e. Argument Structure Realization (Grimshaw 1990; Rapp 2006; Iordăchioaia 2020)

The results will indicate that most word pairs in the data set display directionality. In particular, a verb-to-noun direction of derivation is predicted for most pairs. I will argue that a directional derivational analysis is supported for the pairs which show directionality, while a non-directional analysis seems more plausible for the few pairs in the data set where no direction could be identified on the basis of the diagnostics applied in this study.

The paper is organised in the following way. Section 2 summarizes the main characteristics of ZNs in German which have been identified by previous research and introduces the data set examined in the present study. Section 3 reviews the five directionality diagnostics available in the literature and assesses their applicability and reliability. Section 4 presents the results gained from the application of these diagnostics to the data set. Section 5 discusses what the findings imply for the usage of directionality diagnostics and for the formation of ZNs in German. Section 6 concludes the paper and looks ahead to future research.

2.   Zero-nominals in German
2.1.   Previous research

In the literature, German ZNs such as (*der*) *Lauf* '(the) run' are typically assumed to result from a process of word formation which transfers category-specific bases to a different lexical category and, in contrast to affix-based derivation, does not involve (overt) derivational morphemes. This process is referred to as 'morphological conversion' (Wiese 2002; Fleischer & Barz 2012; Nolda 2013; Eisenberg 2020) or 'zero-suffixation' (Vogel 1996). For example, if we take the ZN (*der*) *Lauf* '(the) run', the basic assumption in these studies is that a verbal base (*laufen* 'to run') has been nominalized without an overt suffix (see Vogel 1996; Nolda 2013; Eisenberg 2020). A slightly different position is taken by Rapp (2006), who argues that only some ZNs in German support a derivational analysis, while others are more likely to result from lexical relisting of a verbal stem in the sense of Lieber (1992).

Note that, in contrast to English, German ZNs are not phonologically identical to the infinitival word form of their related verbs. In German, the infinitive is built by adding the inflectional morpheme *-en* to the verb stem (Fleischer & Barz 2012:88). This ending is not present on the related ZNs, as can be seen in (6).

(6) a.   lauf-**en** 'to run'   –   der Lauf-Ø 'the run'
    b.   dreh-**en** 'to spin'   –   der Dreh-Ø 'the spin'

In some studies (Klein et al. 2009; Fleischer & Barz 2012; Nolda 2013), the fact that the ending *-en* is not present on ZNs in German is taken to indicate that these nominals are built from a stem form of their related verb, not from the infinitival word form.

German ZNs such as (*der*) *Lauf* '(the) run' have predominantly masculine gender, while ZNs with neutral or feminine gender occur very rarely (Fleischer & Barz 2012; Nolda 2013). Furthermore, ZNs can be built from morphologically simple or complex verbs which are either inflected regularly or irregularly (Fleischer & Barz 2012; Eisenberg 2020). This is illustrated in (7) and (8).

(7)   Simple verbal bases:
    a.   *regularly inflected*:   bau-en$_\text{V.INF}$ 'to build'   –   bau-**te**$_\text{V.PAST}$ –   der Bau-Ø 'the construction'
    b.   *irregularly inflected*:   fang-en$_\text{V.INF}$ 'to catch'   –   f**i**ng-Ø$_\text{V.PAST}$ –   der Fang-Ø 'the catch'

(8)   Complex verbal bases (see also Fleischer & Barz 2012:268):
    a.   *regularly inflected*:   **ver**-hör-en$_\text{V.INF}$ 'to interrogate'   –   ver-hör-**te**$_\text{V.PAST}$ –   das Ver-hör-Ø 'the interrogation'
    b.   *irregularly inflected*:   **zer**-fall-en$_\text{V.INF}$ 'to decay'   –   zer-f**ie**l-Ø$_\text{V.PAST}$ –   der Zer-fall-Ø 'the decay'

Another important property of ZNs in German is that various phonological changes might occur between the noun and the infinitival word form of the related verb. Examples are given in (9) (see also Nolda 2013:27).

(9) a.   **r**e**it**-en 'to ride'   –   der R**itt**-Ø 'the ride'   (ablaut [*ei-i*])
    b.   **fl**ie**g**-en 'to fly'   –   der Fl**ug**-Ø 'the flight'   (ablaut [*ie-u*])
    c.   **z**ie**h**-en 'to pull'   –   der Z**ug**-Ø 'the pull'   (ablaut [*ie-u*] +
                                                                                     Grammatischer Wechsel
                                                                                     'grammatical alternation'
                                                                                     [*h-g*])
    d.   spr**i**ng-en 'to jump'   –   der Spr**ung**-Ø 'the jump'   (ablaut [*i-u*])
    e.   w**e**rf-en 'to throw'   –   der W**urf**-Ø 'the throw'   (ablaut [*e-u*])
    f.   w**a**chs-en 'to grow'   –   der W**uchs**-Ø 'the growth'   (ablaut [*a-u*])
    g.   s**e**tz-en 'to leap'   –   der S**atz**-Ø 'the leap'   (back umlaut [*e-a*])
    h.   tr**e**t-en 'to kick'   –   der Tr**itt**-Ø 'the kick'   (*e/i*-Wechsel '*e/i* change')
    i.   der K**a**mpf-Ø 'the fight'   –   k**ä**mpf-en 'to fight'   (umlaut [*a-ä*])
    j.   der K**u**ss-Ø 'the kiss'   –   k**ü**ss-en 'to kiss'   (umlaut [*u-ü*])

Of these phonological changes between ZNs and their related verbs, only ablaut (illustrated in (9a) to (9f)) is commonly discussed in the context of morphological conversion in German. Ablaut is a systematic vowel change found in Indo-European languages which marks different tense forms in the paradigm of so-called strong verbs (e.g. English *sing – sang – song*). With respect to ZNs in German, the question that arises is where the ablaut on the noun exactly comes from. Some studies (Vogel 1996; Eisenberg 2020) assume that the nominals are (implicitly) derived from their respective verbs by means of ablaut. Others (Wiese 2002; Klein et al. 2009; Fleischer & Barz 2012; Nolda 2013) argue that ZNs displaying ablaut are built from ablauted stem forms of their related verbs (e.g. the preterite or the participle stem form). Further research is needed to investigate this topic in more detail. In the present study, nouns like the ones in (9) count as ZNs because they are not derived by overt derivational affixes from a synchronic point of view (in contrast to transparently suffix-based nominals built with *-erei* or *-ung*, for instance, see (1)).

As to their semantics, there is a consensus in previous studies that deverbal ZNs in German often receive lexicalized and sometimes idiomatic interpretations (see Vogel 1996; Eisenberg 2020). Fleischer & Barz (2012:269) point out that deverbal ZNs can be polysemous and have a wide range of different readings: they may denote actions (as in *springen* 'to jump' – *der Sprung* 'the jump'), entities which are affected by actions or result from them (as in *rufen* 'to call' – *der Ruf* 'the call'), concrete objects (as in *vertragen* 'to tolerate' – *der Vertrag* 'the contract') or persons (as in *besuchen* 'to visit' – *der Besuch* 'a guest, guests'). Vogel (1996) argues that deverbal ZNs typically constitute 'Verbalabstrakta' 'verbal abstract nouns', given that they refer to entities without concrete spatio-temporal properties. Nolda (2013) finds that deverbal ZNs denote events, which he understands to be discrete, telic processes. Given that most ZNs can be pluralized, they are assumed to constitute individuative nouns (Nolda 2013).

Regarding the productivity of ZNs in German, previous research (Fleischer & Barz 2012; Eisenberg 2020) has established that morphological conversion of verbal bases into nominals is not productive in present-day German, or only to a very limited extent. In contrast, morphological conversion of nominals into verbs (e.g. *der Dampf* 'the steam' → *dampfen* 'to steam'; Eisenberg 2020:308) is assumed to be productive.

This leads us to the question of directionality. At the beginning of this section, it has been stated that nouns like (*der*) *Lauf* '(the) run' are typically assumed to be deverbal nominalizations, i.e. a derivational direction from verb to noun has been posited. This is not self-evident. In

the absence of morphological marking, both options seem plausible: that the nouns have been derived from the related verbs or vice versa (V-to-N vs. N-to-V). As already mentioned in the introduction, the subject of directionality in German zero-related word pairs has only briefly been addressed in previous research (Vogel 1996; Wiese 2002; Fleischer & Barz 2012; Nolda 2013; Eisenberg 2020). The only study focusing on directionality in German zero-derivations is Plank (2010), where the relationship between the adjective *fett* 'fat' and the noun *Fett* 'fat' is examined. In the other studies, various directionality diagnostics have been proposed and exemplified, concerning the historical relationship between the words, the frequency with which they are used, the semantic relationship between them and various formal properties (see Section 3). However, it has also been stated that these diagnostics do not yield a clear result for each zero-related word pair in German, which is typically taken to indicate that the derivational direction cannot be determined in each case (see Vogel 1996; Wiese 2002; Eisenberg 2020).

2.2. *Database and data set examined in the present study*

To investigate to what extent zero-related word pairs in German display directionality, I examine a data set of 60 German verb-noun pairs, which are part of a larger database. This database is a self-created collection of 111 entries of German ZNs and their related verbs. These word pairs were collected partly from examples found in the literature on ZNs in German and partly from introspection, using my intuition as a native speaker of German. The database documents the information described in (10).

(10) a. Etymology and date or century of first attestation (Att.) for each noun and verb, following Pfeifer & Braun (1989–1993)
 b. Frequency of usage (Freq.) on a scale from 1 = 'rare' to 7 = 'frequent' for each noun and verb, following the DWDS – Digitales Wörterbuch der deutschen Sprache [Digital dictionary of the German language] (2021)[2]
 c. Dictionary senses for each noun and verb, following the DWDS
 d. Tense inflection (whether the verb is regularly or irregularly inflected), following the DWDS
 e. Argument realization (whether DPs assumed to encode the noun's internal arguments are attested in DWDS-corpora)[3]

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[2] The DWDS calculates a word's frequency of occurrence on the basis of contemporary language corpora (*DWDS-Kernkorpus*, *Metakorpus WebXL*, *DWDS-Zeitungskorpus* and *ZDL-Regionalkorpus*). In total, these corpora contain more than 25 billion tokens, covering fictional and functional literature, scientific texts, newspapers and websites mainly from Germany, Austria and Switzerland. For the calculation of a word's frequency of occurrence, both the absolute frequency of the respective word and the ratio of this number to the total size of the corpus are taken into account (*https://www.dwds.de/d/worthaeufigkeit*, last accessed 15th April 2021).

[3] In order to assess the argument-taking properties of the nouns in the data set, a corpus investigation was conducted for this study in August 2020. I searched six corpora available via the DWDS website (*https://www.dwds.de/r*), which in total contain more than one billion tokens and which consist of fictional and fictional literature, scientific texts and German newspapers, dating mainly from the 20th and 21th century. The corpora are: *DWDS Kernkorpus (1900–1999)*, *DWDS Kernkorpus 21 (2000–2010)*, *Deutsches Textarchiv (1598–1913)*, *Berliner Zeitung (1994–2005)*, *Der Tagesspiegel (ab 1996)* and *Die ZEIT (1946–2018)*. I checked each noun in the data set in terms of whether it occurs in an event reading with phrases corresponding to internal arguments of the related verb (see also Section 3).

The database is illustrated by two example entries in Table 1.

Form ZN	Form Verb	Att. ZN	Att. Verb	Freq. ZN	Freq. Verb	Senses ZN	Senses Verb	Inflection Verb	Argument ZN
der Fall 'the fall'	*fallen* 'to fall'	8thc.	8thc.	6	5	(1) the falling (2) the sinking from happiness into ruin, from reputation into contempt	(1) to go into a rapid, downward movement as a result of gravity (2) to become lower in height (3) to perish ...	irregular: *fallen*$_{V.INF}$ 'to fall' – *fiel*$_{V.PAST}$	*dem Fall der Mauer* 'the fall of the wall'
das Spiel 'the play'	*spielen* 'to play'	9thc.	8thc.	6	6	(1) freely chosen activity which is not socially or economically directed (2) number of things needed for some social games (3) creation, interpretation ...	(1) to engage in a game for entertainment (2) to create an artistic interpretation of sth. (3) to pretend to be sb. or sth. ...	regular: *spielen*$_{V.INF}$ 'to play' – *spielte*$_{V.PAST}$	–

Table 1: Database entries for *der Fall* 'the fall' and *das Spiel* 'the play' (columns 'Senses' shortened)

In this paper, a subset of 60 verb-noun pairs from the above database is investigated. Criteria for selecting the pairs were as follows: first, the words are morphologically simple, i.e. do not display overt affixes or particles, as exemplified in (11) in contrast to (12).

(11)   *included*:
    a.   bau-en 'to build'   –   der Bau 'the construction'
    b.   schließ-en 'to conclude'   –   der Schluss 'the conclusion'

(12)   *excluded*:
    a.   **um**-bau-en 'to reconstruct'   –   der **Um**-bau 'the reconstruction'
    b.   **be**-schließ-en 'to decide'   –   der **Be**-schluss 'the decision'

Word pairs where the noun is related to a particle verb or a prefix verb (exemplified in (12a) and (12b) respectively) were not included in this investigation, because they are so widespread in German that it would have exceeded the capacities of the present study to examine them. I leave this topic for future research.

Second, the word pairs were selected to exhibit a transparent semantic relation in at least one dictionary sense. For instance, this applies to the pair in (13), but not to the one in (14).

(13)   *included*: lauf-en 'to run'   –   der Lauf 'the run'

(14)   *excluded*: brauch-en 'to need'   –   der Brauch 'the custom'

In (13), the noun can receive an interpretation which refers to meaning encoded by the verb: *der Lauf* 'the run' means 'the walking' or 'the running', among others (DWDS). In contrast, the noun and the verb in (14) are not transparently semantically related in present-day German: *der Brauch* 'the custom' is mainly used in the sense of 'the folksy custom' today, whereas *brauchen* means 'to need something or someone' or 'to use, employ something' (DWDS). This investigation is limited to verb-noun pairs of the first kind, where the words are considered to be both formally and semantically related in present-day German.

Third, word pairs were included in the investigation if their nouns receive an event and/or state interpretation (often besides other readings). For instance, this applies to the nouns in (15), but not to ones in (16).

(15)   *included*:
    a.   flieg-en 'to fly'   –   der Flug 'the flight'
    b.   schlaf-en 'to sleep'   –   der Schlaf 'the sleep'

(16)   *excluded*:
    a.   haus-en 'to dwell'   –   das Haus 'the house'
    b.   kreis-en 'to circle'   –   der Kreis 'the circle'

Der Flug 'the flight' and *der Schlaf* 'the sleep' can refer to events ('the flying') or states ('the resting state of the organism'), respectively (DWDS). In contrast, *das Haus* 'the house' and *der Kreis* 'the circle' denote physical objects ('the building constructed for people' and 'the line running at the same distance around a point', respectively) or a group of people ('the totality of the persons belonging to a house' and 'the social group, class, society', respectively) (DWDS). This difference corresponds to the distinction between process-centered words (e.g. *to kiss/the kiss*, *to touch/the touch*, *to walk/the walk*) and thing-centered words (e.g. *to bag/the bag*, *to saddle/the saddle*, *to shovel/the shovel*) drawn in Farrell (2001) with respect to English. This study is limited to ZNs of the first kind; further research might explore word pairs of the second kind.

Summarizing, the 60 verb-noun pairs examined in this study are part of a larger, self-created database of German zero-related word pairs. The pairs were chosen on the basis of three criteria: (1) the words are morphologically simple, (2) the noun and the verb are transparently semantically related in present-day German, and (3) the noun is process-centered, i.e. receives an event and/or state interpretation.

3.   *Directionality diagnostics*

One of the objectives of this study is to assess the usefulness of directionality diagnostics in identifying the derivational direction (if any) in German zero-related verb-noun pairs. In this section, the five diagnostics (Date of First Attestation, Frequency of Occurrence, Semantic Dependency, Inflectional Behaviour and Argument Structure Realization) are introduced and

discussed in terms of their applicability and reliability.

Diagnostic (5a), Date of First Attestation, tells us that derived words appear later in the history of the language than their base words (Marchand 1963b; Vogel 1996; Plag 2003). Accordingly, if the noun of a zero-related word pair is first attested after the verb, the diachronic diagnostic predicts a V-to-N direction for this word pair, and vice versa. This is illustrated in (17a) and (17b) for English and German, respectively (the date of first attestation, where I follow the OED and Pfeifer & Braun 1989–1993, is indicated in square brackets).

(17) a.   to crowd [*937*]   →   the crowd [*1567*]   (Plag 2003:108)
      b.   reit-en 'to ride' [*9th century*]   →   der Ritt 'the ride' [*16th century*]

Both verbs in (17) are first attested before the respective ZNs, which indicates a V-to-N direction from a diachronic point of view. Note, however, that the diachronic diagnostic is only useful to a limited extent, in particular when we try to identify the derivational direction in a given word pair at a synchronic level. As Plag (2003:108–109) points out, the words' semantics might change in time and present-day intuitions might indicate a different direction than the one historically attested. As to the pair in (17a), most speakers would probably consider the verb to be derived from the noun (N-to-V) on the basis of the interpretations that these words receive in present-day English (Plag 2003:108). However, diachrony indicates the opposite direction. Further shortcomings of this diagnostic are that it does not indicate a direction if both words first appear at the same time (Marchand 1963a:177) and that it is inapplicable when the date of first attestation is unknown for one word or both. Finally, it is important to bear in mind that the diachronic diagnostic is not entirely reliable, since we cannot be sure that the date of first attestation indeed corresponds to the first use of the relevant word.

As to Diagnostic (5b), Frequency of Occurrence, Marchand (1963a), Plag (2003) and Fleischer & Barz (2012) hypothesize that derived words are semantically more complex and specific than their bases and thus used less frequently. Accordingly, if the noun of a zero-related word pair is used less frequently than the verb, a V-to-N direction is predicted, and vice versa. This is illustrated in (18a) and (18b) for English and German, respectively (the frequency of occurrence, where I follow the OED and the DWDS, is indicated in square brackets, using a scale from 1 = 'rare' to 7 [DWDS] or 8 [OED] = 'frequent').

(18) a.   the water [*7*]   →   to water [*6*]   (Plag 2003:111)
      b.   brech-en 'to break' [*5*]   →   der Bruch 'the breakage' [*4*]

In (18a), the noun is used more frequently than the related verb, which indicates an N-to-V derivation. In (18b), it is the verb which occurs more frequently, indicating a V-to-N direction.

The frequency-based diagnostic also presents some limitations. First, the frequency relation between a noun and its corresponding verb might reverse in time: words which occur frequently in present-day German might have been less common at an earlier stage in the history of the language and vice versa. Second, the diagnostic does not predict a direction when both words of a zero-related pair occur with equal frequency. Third, frequency values are highly corpus dependent and may not correspond accurately to the linguistic reality that is to be examined. Fourth, the frequency of occurrence may not exclusively depend on the words' semantic complexity and specificity, but might be influenced by other factors as well, for example the availability of lexical items with similar interpretations. In all these cases, it would be misleading to assume that the words' frequency of occurrence indicates a particular derivational relationship.

With regard to Diagnostic (5c), Semantic Dependency, Marchand (1963b), Vogel (1996), Plag (2003) and Plank (2010) hypothesize that derived words semantically depend on their bases. Accordingly, if the meaning of the noun of a zero-related word pair draws on the meaning of the verb (but not vice versa), a V-to-N direction is more plausible on semantic grounds than an N-to-V direction, and vice versa. This is illustrated in (19) and (20) for English and German, respectively (one word's semantic components drawing on the meaning of the other word are marked in bold).

(19) a. a bottle   (*bottle*, n.$_3$; OED)
           (i)   'a container with a narrow neck and wider body, for holding or storing liquids, pills, etc.'
      b. to bottle   (*bottle*, v.$_1$; OED)
           (i)   'to put something into **bottles** for the purpose of storing or keeping'
                                                                                            (Plag 2003:109)

(20) a. bau-en [to build]   (*bauen*; DWDS)
           (i)   'etwas durch plangemäßes, festes Zusammenfügen einzelner Teile zu einem bestimmten Zweck für die Dauer errichten, zusammensetzen [to erect, assemble something for the long term by the planned, fixed joining together of individual parts for a specific purpose]'
           (ii)   ' etwas schaffen, gestalten [to create, design something]'
      b. der Bau [the construction]   (*Bau*; DWDS)
           (i)   'das **Bauen**, Errichten [the building, erecting]'
           (ii)   'Art, wie etwas **gebaut** ist, Gliederung, Struktur [the way something is built, arrangement, structure]'
           (iii)   'Stelle, wo **gebaut** wird [site where construction is taking place]'
           (iv)   'das **Gebaute**, Errichtete [what has been built, erected]'

In (19), the meanings of the English noun *bottle* and the related verb *to bottle* are given, using descriptions provided by the OED. In (19a), the object denoted by the noun is described without referring to the action denoted by the verb. In contrast, in (19b), the semantic description of the verb contains the noun, presupposing that one knows what a bottle is even if one does not know what it means to bottle something. This can be taken to indicate that, according to the descriptions in the OED, the noun is semantically more basic than the verb, whereas the meaning of the verb builds on the meaning of the noun (Plag 2003:109). Thus, an N-to-V direction is predicted by Semantic Dependency for this word pair.

In (20), the meanings of the German verb *bauen* 'to build' and the related noun *Bau* 'construction' are given, using descriptions provided by the DWDS. As can be seen in (20a), the actions denoted by the verb are described independently from the noun and its meanings. In (20b), on the other hand, all the descriptions of the meanings encoded by the noun contain a form of the related verb (the nominalised infinitive in (i) and the participle in (ii) to (iv)). These descriptions indicate that the noun's meanings draw on the meaning(s) encoded by the verb. Accordingly, a V-to-N direction is predicted by Semantic Dependency for this word pair.

In the present study, the application of the semantic diagnostic is based on the descriptions of the words' meaning(s) given by the DWDS, as illustrated in (20) above. A major advantage of using a lexical resource such as the DWDS is that the way the words' meanings are described is not influenced by the research question addressed in this study. For a pair of verb *A-en* and

noun *A*, I consider *A-en* to semantically depend on *A* only if the semantic description of *A-en* contains *A* and the semantic description of *A* does not contain *A-en* (see (19)). For a pair of verb *B-en* and noun *B*, I consider *B* to semantically depend on *B-en* only if the semantic description of *B* contains *B-en* and the semantic description of *B-en* does not contain *B* (see (20)).[4]

Nevertheless, there are limits to the semantic diagnostic and its ability to predict a derivational direction for zero-related word pairs. First, the diagnostic is inapplicable when there is no semantic relation between noun and verb in present-day German (e.g. due to lexicalization or idiomatization processes), as in (14) above. Second, the application of the semantic diagnostic is challenging for polysemous word pairs (Plank 2010; Bram 2011). As Plank (2010) shows, the derivational direction can be different for different senses of a single lexical item. Finally, it is important to bear in mind that the directionality results yielded by the semantic diagnostic largely depend on how the words' meanings are conceptualized. For example, if the meaning of verb *A-en* is described as 'to B in a way C with D', and the meaning of the related noun *A* is described as 'the process of A-ing', then we will find that the noun semantically depends on the verb and that a V-to-N direction is indicated. In contrast, if the meaning of the verb is described as 'to realize an event of A' or 'to do E with A', then we will find that the verb semantically depends on the noun and that an N-to-V direction is predicted.[5]

Diagnostic (5d), Inflectional Behaviour, tells us that derived words are inflected regularly. Plag (2003:109–110) argues that irregularly inflected words must be learned by language learners item by item and that (newly created) words, for which no entry is stored yet in the mental lexicon, are inflected regularly. Thus, irregularly inflected words most likely are bases. Plag gives the example in (21).

(21) a. to ring – rang $\rightarrow$ a ring-Ø (*sound*) (*V-to-N*)
      b. a ring (*object*) $\rightarrow$ to ring-Ø – ringed (*N-to-V*) (Plag 2003:109)

In (21a), the verb *to ring* ('to make a clear, resonant or vibrating sound') is inflected irregularly. This indicates that it is the base from which the noun *ring* ('a ringing sound') is derived (V-to-N derivation). In contrast, in (21b), the verb *to ring* ('to provide with a ring') is inflected regularly. This indicates that the noun *ring* ('a hollow circular object') is the base from which the verb is derived (N-to-V derivation).

An example from German is given in (22).

(22) fang-en$_{\text{V.INF}}$ 'to catch' – fing-Ø$_{\text{V.PAST}}$ $\rightarrow$ der Fang-Ø 'the catch'

The verb in (22) is inflected irregularly, which indicates that it is the base, and the ZN is derived (V-to-N). Note, however, that Inflectional Behaviour is not diagnostically conclusive when the verb is inflected regularly. Regular inflection on the verb does not necessarily indicate the opposite (N-to-V) direction, because it might have other reasons, e.g. diachronic change. For a few verbs in the data set which are regularly inflected in present-day German (*bauen* 'to build', *fluchen* 'to curse', *handeln* 'to trade' and *stürzen* 'to fall'), irregular forms are attested in earlier stages of German (DWB – Deutsches Wörterbuch von Jacob Grimm und Wilhelm Grimm [German dictionary by Jacob Grimm and Wilhelm Grimm] 1854–1961). In light of this, it would be misleading to assume that regular inflection on the verb indicates an N-to-V derivation.

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[4] A very similar notion of semantic dependency is used in Bram's (2011) investigation of directionality in English conversion pairs (see Bram 2011:114, 126).

[5] Many thanks to Zi Huang for pointing this out to me.

As to Diagnostic (5e), Argument Structure Realization, I follow Grimshaw (1990) in hypothe-
sizing that deverbal nominals may inherit an internal aspectual analysis from their base verbs.
They are associated with an event structure and take grammatical arguments, as illustrated in
(23).[6]

(23) a. The enemy destroyed the city.
      b. The enemy's destruction of the city.   (Grimshaw 1990:46)

As shown in (23), the nominal *destruction* can realize arguments of the kind its corresponding
verb *to destroy* does. The PP *of the city* (Patient) and the possessive phrase *the enemy's* (Agent)
in (23b) correspond to the arguments of the verbal predicate in (23a). Grimshaw (1990:66)
assumes that derived nominals may inherit these argument-taking properties from their base
verbs in the process of nominalization.

   In the present paper, the ability to project grammatical arguments is used as a directional-
ity diagnostic (see also Iordăchioaia 2020 for ZNs in English). If the noun of a zero-related
word pair takes arguments of the kind its related verb does, this is taken to confirm a V-to-N
derivation. An example from German is given in (24).

(24) a. Helena   fand die   Reliquien.
          Helena.NOM.SG found the.ACC.PL relics.ACC.PL
          'Helena found the relics.'
      b. Der   Fund   der   Reliquien   durch Helena.
          the.NOM.SG discovering.NOM.SG the.GEN.PL relics.GEN.PL by   Helena.ACC.SG
          'The discovering of the relics by Helena.'

In (24b), the noun *Fund* 'discovery' takes the DP *der Reliquien* 'the relics' and the PP *durch
Helena* 'by Helena', corresponding to the Theme argument and the Agent argument of the verb
finden 'to find' in (24a), respectively. This indicates a V-to-N derivation. Note, however, that
this diagnostic is only applicable to a limited extent. Grimshaw (1990:108–109) argues that
the argument structure of complex event nominals must be different from that of active verbs,
since possessive phrases in nominals which correspond to the subject of verbal predicates are
systematically optional. This is illustrated in (25).

(25)   The (enemy's) destruction of the city was unexpected.   (Grimshaw 1990:109)

The possessive phrase *The enemy's* in (25) corresponds to the external Agent argument of the
active verbal predicate *to destroy*. The sentence is grammatical regardless of whether the exter-
nal argument is realized or not. Grimshaw (1990:107–150) hypothesizes that possessive phrases
such as *The enemy's* are licensed by the argument structure of a complex event nominal, but they
do not satisfy argument structure positions and thus their presence is not required obligatorily.
Given this optionality of phrases corresponding to external arguments, the argument structure
diagnostic applied in this study is limited to phrases taken by nominals which correspond to in-
ternal arguments, such as *der Reliquien* 'the relics' in (24) above. Accordingly, this diagnostic
is only meaningful with respect to word pairs where the verb takes an internal argument (i.e.
unaccusative, transitive and ditransitive predicates).

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[6] However, see Newmeyer (2009) and Grimm & McNally (2013) for challenges to Grimshaw's view that
complex event nominals have argument structure.

This section has reviewed five diagnostics which are supposed to help us identify the derivational direction (if any) in zero-related word pairs. From the discussion, it is expected that each diagnostic is subject to certain restrictions in terms of applicability. When applicable, however, the diagnostics Semantic Dependency, Inflectional Behaviour and Argument Structure Realization are expected to yield more reliable results than the diagnostics Date of First Attestation and Frequency of Occurrence. As noted above, the diachronic direction predicted by Date of First Attestation does not necessarily correspond to the words' derivational relation considered from a synchronic point of view, and the frequency-based direction predicted by Frequency of Occurrence is highly dependent on the corpus where the words' frequency of usage has been measured.

4. Results

In the present study, the five diagnostics were applied to a data set of 60 German ZNs in order to find out which of these nominals show directionality. The results obtained from each diagnostic are shown in Table 2.

Diagnostic	V-to-N	N-to-V	No direction
(5a) Date of First Attestation	31 (51%)	4 (7%)	25 (42%)
(5b) Frequency of Occurrence	27 (45%)	7 (12%)	26 (43%)
(5c) Semantic Dependency	39 (65%)	0	21 (35%)
(5d) Inflectional Behaviour	36 (60%)	–	24 (40%)
(5e) Argument Structure Realization	20 (33%)	–	40 (67%)

Table 2: Overview of results obtained from the directionality diagnostics (total: 60 N-V pairs)

As can be seen from Table 2, Diagnostics (5a) and (5b) predict both derivational directions, V-to-N for the majority of word pairs and N-to-V for a small portion of the data set. Diagnostics (5c), (5d) and (5e) predict only one direction, namely V-to-N, for a different amount of data in each case. Diagnostic (5c) does not yield the opposite direction for any word pair in the data set and Diagnostics (5d) and (5e) are not used in the present study to indicate an N-to-V derivation. Diagnostic (5c) has the best coverage in predicting a V-to-N direction, which is expected, given that the ZNs in the data set were selected to receive an event and/or state interpretation of the action encoded by the verb. No diagnostic used in the present study predicts a derivational direction for each word pair in the data set, i.e. for each diagnostic, there is a certain amount of word pairs where no direction could be identified. This is expected, given the limited applicability of each diagnostic (see Section 3).

Let us now consider the question to what extent the ZNs in the data set show directionality on the basis of the diagnostics applied in this study. Preliminarily, for 52/60 word pairs (87%), a particular derivational direction is predicted by one or more diagnostics applicable to this pair: V-to-N for 48/60 pairs (80%) and N-to-V for 4/60 (7%) pairs. An example of the former is given in (26).

(26)   kauf-en 'to purchase'   →   der Kauf-Ø 'the purchase'

For the pair in (26), a V-to-N direction is indicated by the diagnostics Semantic Dependency

and Argument Structure Realization. First, the noun draws on the verb in both its interpretations ('the action of purchasing' or 'that which has been purchased'). Second, it has been found to realize phrases corresponding to the internal Theme argument of the related verb (illustrated in (27)). The remaining diagnostics do not indicate a direction for this pair, because the words are first attested at the same time, occur with equal frequency, and the verb is inflected regularly.

(27)   Gleich zu Beginn   seiner Tätigkeit überredete mich Rudi zum **Kauf   einer**
         right   at beginning his   job   persuaded me   Rudi for   purchase a
         teuren   und anfälligen Espressomaschine, die einzig und allein   ihm
         expensive and fragile   espresso.machine   that solely and exclusively him
         gehorchte.
         obeyed
         'Right at the beginning of his job, Rudi persuaded me to buy an expensive and fragile
         espresso machine that obeyed him alone.'   (*DWDS-Kernkorpus 21*)

In (28), a word pair is illustrated for which the opposite direction (N-to-V) is predicted.

(28)   die Antwort 'the reply'   →   antwort-en 'to reply'

For this pair, an N-to-V direction is indicated by Date of First Attestation, because the noun (first attested in the 8th century) appears before the verb (first attested in the 9th century). The other diagnostics do not indicate a direction for this pair: the words occur with equal frequency, they are semantically interdependent, the verb is inflected regularly, and the noun does not realize argument structure.

For 2/60 word pairs in the data set, no derivational direction could be identified on the basis of the diagnostics applied in this study. The pairs are given in (29).

(29) a.   der Kampf 'the fight'   –   kämpfen 'to fight'
     b.   der Krach 'the noise'   –   krachen 'to crack'

For these pairs, no diagnostic indicates a direction. In each case, the noun and the verb first appear in the same period of time and are used with equal frequency. There is no clear asymmetric dependency relation identifiable between the verbal and the nominal interpretation, the verbs are not inflected irregularly and the nouns do not realize argument structure.

For 6/60 word pairs in the data set, the diagnostics indicate opposite derivational directions (V-to-N and N-to-V). These pairs are given in (30).

(30) a.   druck-en 'to print'   ↔ der Druck-Ø 'the print'
     b.   fall-en 'to fall'   ↔ der Fall-Ø 'the fall'
     c.   fluch-en 'to curse'   ↔ der Fluch-Ø 'the curse'
     d.   mord-en 'to murder'   ↔ der Mord-Ø 'the murder'
     e.   rat-en 'to advice'   ↔ der Rat-Ø 'the advise'
     f.   stürz-en 'to fall'   ↔ der Sturz-Ø 'the fall'

(30a) presents a conflict between Frequency of Occurrence, which predicts N-to-V, and the diagnostics Inflectional Behaviour and Argument Structure Realization, both of which predict V-to-N. The remaining diagnostics are undecided. As to Frequency of Occurrence, a direction from noun to verb is indicated because the noun (frequency value 5) occurs more frequently than

the verb (frequency value 4). However, this result must be interpreted with caution because the noun *Druck₁* 'print', related to the verb *drucken* 'to print', is identical in form to the noun *Druck₂* 'pressure', related to the verb *drücken* 'to press'. When calculating the frequency of occurrence, the DWDS did obviously not distinguish between these two lexical items, since the frequency-based analyses (frequency of occurrence and word trajectory) provided for *Druck₁* 'print' and *Druck₂* 'pressure' are identical. Accordingly, the relatively high frequency value indicated for *Druck₁* 'print' might result from the fact that the occurrences of *Druck₂* 'pressure' have been included within the measurement. Thus, given that we do not know for certain how frequently *Druck₁* 'print' occurs in the DWDS corpora, I exclude the directionality result predicted by Frequency of Occurrence for this pair from the investigation and consider the words in (30a) to display a V-to-N direction, as predicted by the applicable diagnostics.

A similar problem arises with the pair in (30b). Again, there is a conflict involving Frequency of Occurrence, which predicts N-to-V, whereas Semantic Dependency, Inflectional Behaviour and Argument Structure Realization indicate V-to-N. As was the case with *Druck₁* 'print', the high frequency value provided for *Fall* 'fall' (frequency value 6 for the noun vs. frequency value 5 for the related verb) should be treated with caution because there are three lexical items corresponding to this form (*Fall₁* 'fall', *Fall₂* 'case', *Fall₃* 'halyard'), for all of which the same frequency analyses have been provided by the DWDS. Accordingly, the frequency measurement for the noun is not considered to be reliable and is excluded from this description. In view of the directionality results yielded by the remaining diagnostics, the pair in (30b) is taken to display a V-to-N direction.

For the word pair in (30c), *fluchen* 'to curse' – *der Fluch* 'the curse', there is disagreement between the diagnostics Date of First Attestation and Frequency of Occurrence. The other diagnostics are undecided. Diachronically, a V-to-N direction is indicated, because the verb is first recorded around 800, while the noun appears in the course of the 9th century (Pfeifer & Braun 1989–1993). From a synchronic point of view, however, the words' frequency of occurrence in corpora points to the opposite (N-to-V) direction, because the noun is used more often than the verb (frequency values 4 vs. 3; DWDS). A possible explanation for this discrepancy is that the semantics of the verb has changed over time (see also the example *to crowd* – *the crowd* given in (17a), Section 3, with reference to Plag 2003): initially, *fluchen* 'to curse' received two interpretations, (i) 'to hurl curses' and (ii) 'to swear crudely'. In present-day German, however, the verb typically receives the second interpretation, while the first one is associated primarily with the prefix verb *ver-fluchen* 'to cuss'. The noun has kept both its interpretations, (i) 'imprecation' and (ii) 'insult' (Pfeifer & Braun 1989–1993), which might be the reason why it is compatible with more linguistic contexts and thus used more frequently than the verb in present-day German. In sum, both derivational directions seem plausible for this word pair (V-to-N from a diachronic point of view vs. N-to-V from a synchronic one) and its directionality result is undecided.

The word pair in (30d), *morden* 'to murder' – *der Mord* 'the murder', shows opposite directions as predicted by the diagnostics Date of First Attestation and Argument Structure Realization, both indicating V-to-N, and Frequency of Occurrence, indicating N-to-V. Diachrony indicates a V-to-N direction, since the verb (first attested in the 8th century) appears before the noun (first attested in the 9th century; Pfeifer & Braun 1989–1993). This direction is supported by the fact that the noun may realize the Patient argument of the verb, as illustrated in (31).

(31)   Der Fall des kleinen Mädchens erinnert an den **Mord   eines Säuglings** [...].
         the case the little   girl   reminds of the murder an   infant   [...]
         'The case of the little girl is reminiscent of the murder of an infant [...].'

<div align="right">(*Berliner Zeitung*)</div>

However, the frequency-based diagnostic tell us that the noun (frequency value 4) is the base
from which the verb (frequency value 3) is derived (DWDS). As explained in Section 3, this
diagnostic is based on the assumption that derived words are semantically more complex and
specific than their bases and thus compatible with fewer linguistic contexts. But this is not what
we find with the word pair in question, where both the verb and the noun receive exactly one
interpretation, which refers to the action of killing someone deliberately (DWDS). Interestingly,
present-day German also has a prefix verb, *er-morden* 'to murder', which receives the same
interpretation as *morden* 'to murder', but which is used more frequently (frequency value 4)
than the simple verb, and this might lead to the decreased frequency of the simple verb *morden*
'to murder'. I will not elaborate on this topic here. What is relevant for this investigation is
that the directionality result indicated by the frequency-based diagnostic for the word pair in
question has to be interpreted with caution, since the difference in frequency between noun
and verb might turn out to be due to other factors, unrelated to the derivational relationship.
Accordingly, in this particular case, I consider the direction predicted for the pair by the other
diagnostics to be a more reliable result and to take *morden* 'to murder' – *der Mord* 'the murder'
to display a V-to-N direction.

For the word pair in (30e), *raten* 'to advice' – *der Rat* 'the advise', opposite directions are
predicted by Frequency of Occurrence, indicating N-to-V, and Inflectional Behaviour, indicating
V-to-N. That the verb is inflected irregularly (*rat-en*$_{V.INF}$ 'to advice' – *riet-Ø*$_{V.PAST}$) indicates that
it is the base, since the output of a derivational process is assumed to be regularly inflected (see
Section 3). In contrast, the frequency-based diagnostic tells us that the derivation went from
noun to verb, since the noun occurs more frequently than the verb (frequency values 5 vs. 4).
If we look at the semantics of the words in question, we find that both receive an interpretation
which refers to the action of counseling someone or to recommend something to someone. The
noun, however, can also refer to a council or council members (DWDS), which is probably
why it occurs more frequently in corpora than the verb. The question that arises is whether the
meaning encoded by the verb in present-day German is indeed more complex and specific than
the meaning encoded by the noun (as suggested by the frequency-based diagnostic) or whether
the noun has simply taken on an additional interpretation in time and is thus currently used in
more linguistic contexts than the verb. Further research is needed to answer this question. For
this investigation, caution is again required. Thus, in the case of *raten* 'to advice' – *der Rat* 'the
advise', I consider the direction indicated by the inflectional diagnostic (V-to-N) to be more
reliable.

Finally, for the pair in (30f), *stürzen* 'to fall' – *der Sturz* 'the fall', there is disagreement
between Date of First Attestation, which indicates an N-to-V direction, and the diagnostics Fre-
quency of Occurrence and Argument Structure Realization, both of which indicate the opposite
(V-to-N) direction. The noun and the verb receive three interpretations, in which they refer to
the actions of falling, decreasing and removing someone from government office. Addition-
ally, the verb receives interpretations in which it refers to the actions of throwing somebody off
something, moving suddenly towards a target and turning something over (DWDS). Given the
broader semantic range covered by the verb, it seems plausible that it occurs more frequently

in corpora than the noun. A V-to-N derivation, as indicated by the frequency-based diagnostic, is thus reasonable. It is also supported by the argument-taking properties of the nominal, which are illustrated in (32).

(32) Es war das verlustreichste   Jahr seit   dem **Sturz der Taliban** durch
      It was the most.loss-making year since the   fall   the Tabliban by
      US-geführte Truppen im Jahr 2001.
      US-led   troops   in year 2001
      'It was the year with the highest number of casualties since the fall of the Taliban by
      US-led troops in 2001.'   (*Die ZEIT*)

However, the diachronic diagnostic tells us that the derivation went the other way round (N-to-V), because the noun, being first attested in the 8th century, appears before the verb, which is first attested around 1000. If we assume that these dates correspond to the linguistic reality and thus, that the result yielded by the diagnostic is reliable, a direction from noun to verb is indicated from a diachronic point of view. Synchronically, however, a V-to-N direction is predicted. As with the word pair in (30c), *fluchen* 'to curse' – *der Fluch* 'the curse', the directionality result for *stürzen* 'to fall' – *der Sturz* 'the fall' is undecided between V-to-N and N-to-V.

Conflicts and undecided results are also reported by Bram (2011), who investigates directionality in English conversion pairs (e.g. *dry – to dry*) on the basis of four diagnostics (attestation date, frequency of occurrence, semantic dependency and semantic range). Bram finds that the results yielded by these diagnostics often contradict each other, but he argues that this is mainly due to various methodological aspects of his study (e.g. the small size of one of the corpora he uses). Thus, according to Bram, the high level of inconsistency of the results in his study is misleading and the diagnostics are suitable in principle to determine directionality in English conversion pairs.

In summary, it has been shown in this section that the directionality diagnostics applied in the present study predominantly predict a V-to-N direction for the word pairs in the data set. Diagnostic (5c), Semantic Dependency, has the best coverage, which is expected since the ZNs were selected to receive an event interpretation encoded by the related verb. However, it has also been found that the applicability of the diagnostics is limited and that none predicts a derivational direction for each word pair. For a few pairs, different diagnostics predict opposite directions. These conflicts could be resolved in favor of a V-to-N derivation for most pairs; for the remaining ones, both directions seem to be motivated, depending on whether we look at the word pairs from a diachronic or from a synchronic point of view, which is why the directionality result is undecided for these pairs. To conclude the results, 56/60 word pairs have been found to display directionality (52/60 V-to-N, 4/60 N-to-V). 2/60 are undecided between V-to-N and N-to-V and for 2/60 pairs, no direction could be identified on the basis of any diagnostic applied in this study. A table where the directionality result is specified for each word pair in the data set is provided in the appendix.

5. Discussion

In the absence of morphological marking, the theoretical modeling of ZNs is challenging: are these nominals zero-derived from category-specific forms (the corresponding verbs), similarly

to suffix-based nominals, as claimed by derivational theories (Marchand 1963a, 1964; Kiparsky 1982)? Or are they built from underspecified forms, which only get specified for lexical category in the syntactic context, as hypothesized by underspecification theories (Farrell 2001; Borer 2013)? The present study started from the assumption that directionality diagnostics can help us to address this question. To the extent that we can identify the derivational direction (if any) in zero-related verb-noun pairs, this is taken to support a directional derivational analysis, where one form is assumed to be basic and the other one derived.[7] If directionality is not clear however, an underspecification analysis is considered to be more plausible, where both the verbal and the nominal instantiation are assumed to be built from a category-neutral root. Five directionality diagnostics have been applied to a self-collected data set of 60 German verb-noun pairs. In this section, the findings will be discussed.

The first objective of this study was to assess the usefulness of the five directionality diagnostics and I found that to a certain extent they can be used to identify the derivational direction (if any) in German zero-related word pairs. When applied individually, they predict a derivational direction for about one third (Argument Structure Realization) to two thirds (Semantic Dependency) of word pairs in the data set (see also Table 2 in Section 4). Each diagnostic is subject to various restrictions in terms of applicability and reliability, as has been noted in the research literature dealing with conversion in English (Marchand 1963a; Bram 2011; Lohmann 2017) and German (Vogel 1996; Fleischer & Barz 2012; Eisenberg 2020). However, these limitations can be compensated for, to a certain extent, by combining several diagnostics. When the results yielded by the individual criteria are taken together, directionality is indicated for almost each word pair in the data set (56/60 pairs). For a few of these pairs, different diagnostics predict opposite directions. On closer examination of these conflicts, it has been found in particular that the results yielded by Frequency of Occurrence should sometimes be interpreted with caution. First, a methodological problem arises for ZNs which are identical in form to other lexical items and whose frequency of occurrence has obviously not been calculated separately from these homonyms by the DWDS. Second, a conceptual problem of the frequency-based diagnostic is that a lower frequency value cannot always be attributed to a higher level of semantic complexity and/or specificity of the word in question, as assumed with this diagnostic. It has been shown for the pair *morden* 'to murder' – *der Mord* 'the murder', for instance, that words which cover the same semantic range and receive similar interpretations can still differ in terms of their frequency of occurrence in DWDS corpora. Thus, it is important to bear in mind that the words' frequency of occurrence might be influenced by other factors, which may not be directly related to the derivational relationship between them.

The second objective was to find out which word pairs in the data set show directionality and the results indicate that 56/60 pairs are directional according to one or more diagnostics applied in this investigation. 2/60 pairs are undecided between V-to-N and N-to-V and for 2/60 pairs, no diagnostic predicts any derivational direction. For the majority of pairs (52/60), the direction identified on the basis of the diagnostics is V-to-N. For a few pairs (4/60), it is N-to-V. The predominance of V-to-N derivations is expected, since the ZNs in the data set were selected to receive an event interpretation referring to the action or state encoded by the corresponding verb (see also the notion of process-centered words in Farrell 2001). For the two word pairs which are

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[7] Note, however, that admitting the existence of directionality in zero-related word pairs does not always yield a derivational analysis in linguistics. There are linguists who acknowledge a derivational direction and yet, they propose a non-derivational analysis (Lieber 2004; Plag 2003).

undecided, Date of First Attestation predicts a direction which is contrary to the results yielded by the remaining diagnostics. A possible explanation for this is that the respective words have been subject to language change and that the direction indicated by their semantic and formal properties in present-day German does not correspond to their historical relationship anymore (see also the example of *to crowd – the crowd* in Plag 2003:108). This is in agreement with earlier observations, where it has been proposed to distinguish between the diachronic direction and the synchronic one (Marchand 1963a, 1963b; Vogel 1996; Plag 2003; Eisenberg 2020).

The third objective of this study was to investigate what the directionality results imply for the theoretical modeling of German ZNs and the findings largely support a directional derivational analysis. For 56/60 pairs in the data set, the diagnostics applied in this study indicate directionality. This directionality would remain unaccounted for if we adopted an underspecification approach, where the noun and verb of a noun-verb alternation are not assumed to be related by a derivational process (Farrell 2001; Borer 2013). Rather, Farrell (2001) suggests that English words such as *hammer* in (33) and *sneeze* in (34) are semantically underspecified for the noun/verb distinction.

(33) a.   I dropped a hammer   (*noun*)
     b.   I hammered a nail into the board   (*verb*)   (Farrell 2001:109)

(34) a.   That was a loud sneeze   (*noun*)
     b.   They sneezed loudly   (*verb*)   (Farrell 2001:110)

In Farrell's proposal, the lexical semantic representation of such words is compatible with either a thing-centered noun meaning as in (33a) and (34a) or a process-centered verb meaning as in (33b) and (34b). Which of these potential meanings the words have is determined by the morphosyntactic context in which they are used.

Similarly, Borer (2013:311–363) hypothesizes that phonologically unmarked noun-verb alternations in English (e.g. *the chair – to chair*, *the walk – to walk*) emerge from contextual categorization. In her model, category-less roots ($\sqrt{\text{CHAIR}}$, $\sqrt{\text{WALK}}$) merge with functors such as Determiner (D) or Tense (T) and become category-equivalent in the structural context defined by these functors. As illustrated in (35), *chair* and *walk* are either nominal or verbal instantiations of a shared root, depending on whether the root has been rendered categorially noun-equivalent (C=N) or verb-equivalent (C=V) by a corresponding functor.

(35) a.   [D [$_{\text{C=N}}$ $\sqrt{\text{CHAIR}}$]]   [T [$_{\text{C=V}}$ $\sqrt{\text{CHAIR}}$]]
     b.   [D [$_{\text{C=N}}$ $\sqrt{\text{WALK}}$]]   [T [$_{\text{C=V}}$ $\sqrt{\text{WALK}}$]]   (Borer 2013:324)

Overall, underspecification theories as proposed in Farrell (2001) and Borer (2013) are not concerned with directionality in zero-related word pairs, because they neither assume that what is realized as a noun or a verb in a specific morphosyntactic context is inherently associated with a lexical category, nor that there is a category-changing process deriving one word of a zero-related pair from the other one.

In the current study, however, 56/60 German noun-verb pairs have been found to display directionality on the basis of one or more diagnostics. For these pairs, it seems more plausible to employ a derivational analysis, which straightforwardly accounts for directionality, since direction is embedded in derivation. For example, if we were to apply a non-directional analysis to these data, it would be difficult to explain why two thirds of the ZNs have been found to

semantically depend on their related verb, as in *bauen* 'to build' – *der Bau* 'the construction', where the noun's meanings draw on the verb's meaning(s) but not vice versa. If we assumed that both the noun and the verb were built directly from the same root, as hypothesized in Borer (2013), we would probably expect that the semantic relationship between them would be symmetric and that their interpretations would relate to the semantics of the shared root in a similar way. In addition, underspecification theories cannot readily account for the fact that one third of the ZNs in the data set were found to receive an event interpretation in which they realize phrases corresponding to internal arguments of their related verbs. That the respective nominals have the ability to take structural arguments can be explained if we assume that they are associated with an event structure inherited from their base verb in the process of nominalization (Grimshaw 1990; Iordăchioaia 2020). Accordingly, I assume that the word pairs considered to be directional on the basis of the diagnostics applied in this study support a directional analysis, where category-specific forms are transferred to a different lexical category by means of a zero-suffix. The analysis I propose for such pairs is illustrated in (36).

(36) a. $[_{nP} \; \varnothing_n \; [_{vP} \; \varnothing_v \; [\sqrt{\text{KAUF}}] \,] \,]$ (*root-to-V-to-N derivation*)
     b. $[_{vP} \; \varnothing_v \; [_{nP} \; \varnothing_n \; [\sqrt{\text{ANTWORT}}] \,] \,]$ (*root-to-N-to-V derivation*)

For word pairs in the data set which display a V-to-N direction, I assume that roots like $\sqrt{\text{KAUF}}$ in (36a) have first been verbalized and that the verbal bases have then been nominalized by means of a zero-suffix. In the process of nominalization, the nominals may inherit semantic and morpho-syntactic properties from their base verbs, which is why we find that many ZNs semantically draw on their corresponding verb and/or display argument-taking properties, which would be introduced by additional verbal event structure on top of *v*P. For the word pairs displaying an N-to-V direction, I assume that the derivational process goes in the opposite direction: roots like $\sqrt{\text{ANTWORT}}$ in (36b) have first been nominalized and the nominal bases have then been verbalized by means of a zero-suffix. In contrast, for the two word pairs in the data set where no derivational direction could be identified on the basis of the diagnostics, a non-directional analysis is supported, as illustrated in (37).

(37) a. $[_{vP} \; \varnothing_v \; [\sqrt{\text{KRACH}}] \,]$ (*root-to-V derivation*)
     b. $[_{nP} \; \varnothing_n \; [\sqrt{\text{KRACH}}] \,]$ (*root-to-N derivation*)

If we assume that the nominal and the verbal instantiation of a root like $\sqrt{\text{KRACH}}$ are not related by a directional process but built directly from the same root by means of zero functional heads, this might explain why both the noun and the verb are first attested at the same time, occur with equal frequency and are semantically interdependent.

In this analysis, roots are not inherently associated with a lexical category, but get categorized by merging with zero functional heads. The difference between directional word pairs as in (36) and non-directional ones as in (37) is that the former involve a directional category-changing process in the course of which a categorized base gets re-categorized (either in the direction V-to-N or N-to-V). By contrast, both the noun and verb of a non-directional word pair are built directly from the root, which gets categorized either by a nominal or a verbal functional head.

6. Conclusion and future research

The main purpose of the current study was to investigate what directionality diagnostics can tell us about the formation of ZNs in German. I started from the assumption that these diagnostics can be used to provide empirical evidence in favor either of underspecification theories or of derivational ones with respect to the modeling of ZNs, and examined a self-collected data set of 60 German zero-related verb-noun pairs. Five diagnostics (Date of First Attestation, Frequency of Occurrence, Semantic Dependency, Inflectional Behaviour and Argument Structure Realization) were evaluated in terms of their applicability and reliability. From the application of these diagnostics to the data set, it was found that most word pairs show directionality and predominantly support a directional derivational analysis, where the nominals are considered to be derived from verbal bases by means of a zero-suffix. In future work, I intend to extend this analysis to include morphologically complex words in German, where the noun inherits the verb's prefix or particle (e.g. *be-legen* 'to prove' → *der Be-leg* 'the proof'). In addition, further research is needed to examine zero-related word pairs where phonological changes, in particular ablaut, occur between the nominal and the verbal infinitive (e.g. *springen* 'to jump' → *der Sprung* 'the jump'). For instance, research to date has not yet determined why some nominals related to ablauting verbs display ablaut compared to the verbal infinitive, as in (38a), while others do not, as in (38b).

(38) a.   wachs-en$_{\text{V.INF}}$ 'to grow'   –   wuchs-Ø$_{\text{V.PAST}}$ →   der Wuchs-Ø 'the growth'
     b.   schlag-en$_{\text{V.INF}}$ 'to blow'   –   schlug-Ø$_{\text{V.PAST}}$ →   der Schlag-Ø 'the blow'

Abbreviations

ACC	accusative	NOM	nominative
GEN	genitive	PL	plural
INF	infinitive	SG	singular

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A.   Appendix

No.	Verb	Noun	Directionality result
1	*bauen* 'to build'	*der Bau* 'the construction'	V-to-N
2	*beißen* 'to bite'	*der Biss* 'the bite'	V-to-N
3	*blicken* 'to look'	*der Blick* 'the look'	V-to-N
4	*brechen* 'to break'	*der Bruch* 'the breakage'	V-to-N
5	*drucken* 'to print'	*der Druck$_1$* 'the print'	V-to-N
6	*drücken* 'to press'	*der Druck$_2$* 'the pressure'	V-to-N
7	*fallen* 'to fall'	*der Fall* 'the fall'	V-to-N
8	*fangen* 'to catch'	*der Fang* 'the catch'	V-to-N
9	*fliegen* 'to fly'	*der Flug* 'the flight'	V-to-N
10	*fließen* 'to flow'	*der Fluss* 'the flow'	V-to-N
11	*fressen* 'to feed'	*der Fraß* 'the feeding'	V-to-N
12	*finden* 'to find'	*der Fund* 'the discovery'	V-to-N
13	*greifen* 'to grasp'	*der Griff* 'the grasp'	V-to-N
14	*gießen* 'to cast'	*der Guss* 'the casting'	V-to-N
15	*halten* 'to stop'	*der Halt* 'the stop'	V-to-N
16	*handeln* 'to trade'	*der Handel* 'the trade'	V-to-N
17	*kaufen* 'to purchase'	*der Kauf* 'the purchase'	V-to-N
18	*küssen* 'to kiss'	*der Kuss* 'the kiss'	V-to-N
19	*laufen* 'to run'	*der Lauf* 'the run'	V-to-N
20	*loben* 'to praise'	*das Lob* 'the praise'	V-to-N
21	*lügen* 'to ly'	*der Lug* 'lies'	V-to-N
22	*morden* 'to murder'	*der Mord* 'the murder'	V-to-N
23	*raten* 'to advice'	*der Rat* 'the advise'	V-to-N
24	*rauben* 'to rob'	*der Raub* 'the robbery'	V-to-N
25	*reißen* 'to break'	*der Riss* 'the break'	V-to-N
26	*reiten* 'to ride'	*der Ritt* 'the ride'	V-to-N
27	*rufen* 'to call'	*der Ruf* 'the call'	V-to-N
28	*rutschen* 'to slide'	*der Rutsch* 'the slide'	V-to-N
29	*setzen* 'to leap'	*der Satz* 'the leap'	V-to-N
30	*schauen* 'to look'	*die Schau* 'the show'	V-to-N

31	*schlafen* 'to sleep'	*der Schlaf* 'the sleep'	V-to-N
32	*schlagen* 'to blow'	*der Schlag* 'the blow'	V-to-N
33	*schließen* 'to conclude'	*der Schluss* 'the conclusion'	V-to-N
34	*schneiden* 'to cut'	*der Schnitt* 'the cut'	V-to-N
35	*schieben* 'to thrust'	*der Schub* 'the thrust'	V-to-N
36	*schießen* 'to shoot'	*der Schuss* 'the shot'	V-to-N
37	*schwinden* 'to shrink'	*der Schwund* 'the shrinkage'	V-to-N
38	*schwingen* 'to swing'	*der Schwung* 'the swing'	V-to-N
39	*spielen* 'to play'	*das Spiel* 'the play'	V-to-N
40	*springen* 'to jump'	*der Sprung* 'the jump'	V-to-N
41	*stechen* 'to sting'	*der Stich* 'the sting'	V-to-N
42	*stoßen* 'to thrust'	*der Stoß* 'the thrust'	V-to-N
43	*streichen* 'to stroke'	*der Strich* 'the stroke'	V-to-N
44	*tauschen* 'to swap'	*der Tausch* 'the swap'	V-to-N
45	*treffen* 'to meet'	*der Treff* 'the meeting'	V-to-N
46	*treten* 'to kick'	*der Tritt* 'the kick'	V-to-N
47	*trügen* 'to deceive'	*der Trug* 'the deception'	V-to-N
48	*trinken* 'to drink'	*der Trunk* 'the drinking'	V-to-N
49	*wechseln* 'to change'	*der Wechsel* 'the change'	V-to-N
50	*wachsen* 'to grow'	*der Wuchs* 'the growth'	V-to-N
51	*werfen* 'to throw'	*der Wurf* 'the throw'	V-to-N
52	*ziehen* 'to pull'	*der Zug* 'the pull'	V-to-N
53	*antworten* 'to reply'	*die Antwort* 'the reply'	N-to-V
54	*arbeiten* 'to work'	*die Arbeit* 'the work'	N-to-V
55	*danken* 'to thank'	*der Dank* 'the thanks'	N-to-V
56	*flüchten* 'to escape'	*die Flucht* 'the escape'	N-to-V
57	*fluchen* 'to curse'	*der Fluch* 'the curse'	undecided
58	*stürzen* 'to fall'	*der Sturz* 'the fall'	undecided
59	*kämpfen* 'to fight'	*der Kampf* 'the fight'	no direction
60	*krachen* 'to quarrel'	*der Krach* 'the quarrel'	no direction

Table 3: German word pairs examined in the present study, specified for directionality

Is it grammaticalization, though?
On the development of *though* as a discourse marker

Viktorija Blazheska

The paper reopens the question of *though* as a discourse marker with new data and an attempt at refining the points along the pathway. A total of 217 conversations between friends and family taken from the CallFriend and CallHome English Corpora at talkbank.org was searched for instances of *though*, which were then grouped into four categories based on their function: concessive, topic close and concessive, topic shift and concessive, and purely pragmatic. The analysis is both qualitative and quantitative, and the criterion of the position of *though* is also considered.

1. Introduction

The study of discourse markers from a grammaticalization perspective is a valuable synchronic approach to grammaticalization that allows linguists to apply knowledge gained from observing the process at its advanced stages to the identification and analysis of ongoing processes. This allows for past hypotheses to be tested and supplemented, and the various pathways that lead to language change can be better understood.

In a 2002 paper, Barth-Weingarten and Couper-Kuhlen (2002:345) investigated *though* in the final position and its functions on the one hand as a concession marker, and on the other hand in a more recent development as a discourse marker that introduces a topic shift.

The question that arises based on the 2002 findings is whether they can be replicated using another, but similar set of data. Moreover, while the work of Barth-Weingarten and Couper-Kuhlen only considers final *though*, the current study attempts to look at the role of the position of *though* in light of its function and answer the question of the function of *though* as a discourse marker is also evident in the initial and medial positions.

One of the parameters of grammaticalization that is very evident in Barth-Weingarten's and Coupler-Kuhlen's findings is Hopper's (1991:22) principle of persistence, i.e. traces of the original concessive function may still be found in tokens that have begun the process of assuming a different meaning. This is why the greatest number of tokens of *though* found by the two authors have both concessive and textual meanings. The current study goes a step further in separating this big heterogeneous group into two smaller groups in an attempt to narrow down the stages in the grammaticalization process. This emphasizes the nature of grammaticalization as a *continuum*. The first one of the subgroups postulated contains instances

of *though* where the concessive function persists with the additional discourse-marking function of closing the topic, and the second contains tokens where the concessive function persists with the additional discourse-marking function of topic shift. The question asked is whether subdividing the category makes sense for better understanding this grammaticalization pathway.

This paper presents findings from a data set comparable to the one used in the 2002 study, replicates the findings, and brings the two aforementioned questions (the position of *though* and the finer subdivision of one of the categories) up for discussion. To that end, a total of 217 conversations between friends and family taken from the CallFriend and CallHome English Corpora at talkbank.org are analyzed for instances of *though*, which are then grouped into first three, then four categories based on the concessive and textual meaning.

Section 2 of this paper gives a brief theoretical background first on the topic of grammaticalization in general, then on discourse markers, and finally outlines the previous research done that combines both. It also covers examples of *though* serving each of the functions outlined, and explains the expectations of this study. Then, the methodology of the current study is explained, and the results are presented. The section reserved for discussion and the limitations of the study contains a small sub-section on the use of the terms grammaticalization and pragmaticalization. This is followed by the final section which presents the conclusion and outlook.

2. Theoretical background
2.1. Discourse markers

Schiffrin (1987:31) defines discourse markers (DMs) as 'sequentially dependent elements which bracket units of talk'. This is a simple and effective operational definition, because 'units of talk' does not commit to any level of analysis while encompassing all levels, and 'sequentially dependent' is used in the sense that DMs are 'devices that work on a discourse level' (1987:37), meaning that they do not depend on any of the smaller units of talk that make up discourse. With regard to their distribution, she goes on to point out, it is not syntactic constraints that influence it, but rather 'discourse and pragmatic facts' (ibid.). In this way, DMs provide 'contextual coordinates for utterance' (1987:326). This means that the use of DMs helps speakers navigate through spoken discourse and structure their conversations.

Fraser (1999) also gives a definition of DMs that fits with the purpose of this study. He defines them as a 'pragmatic class […] drawn from the syntactic classes of conjunctions, adverbials, and prepositional phrases' (1999:950). This definition seems to imply that an element can change class when it functions as a discourse marker, and this is in line with Hopper's principle of de-categorialization (1991:22). Stede and Schmitz, who have worked on translating DMs, note the 'standard, semantic meaning' (2000:137) of certain elements that double as DMs. When working with DMs, then, one comes across a set of elements that share the same form as representatives of other classes of words, but form a class of their own based on their common function.

Furthermore, Fraser delineates the core meaning of DMs as procedural, not conceptual, stressing the importance of the given context to interpret the exact meaning of the element (1999:950). Similarly, Stede and Schmitz stress their 'pragmatic effect' rather than 'propositional content' (2000:143).

Both of these points overlap with Schiffrin's observation about DMs providing contextual coordinates for utterances.

2.2. Grammaticalization

It is agreed (see e.g. Lehmann 2015:1; Di Meola 2000:5; Lipavic Oštir 2004:18) that the first mention of the term *grammaticalization* goes back to Antoine Meillet and his 1912 essay 'L'évolution des formes grammaticales' ('The evolution of grammatical forms'). He uses this term to describe an *attribution du caractère grammatical à un mot jadis autonome*, an 'attribution of grammatical character to a formerly autonomous word' (Lehmann 2015:5).

However, the starting point of the grammaticalization process need not always be a fully lexical item, and grammaticalization may also be understood as a shift 'from a less grammatical to a more grammatical status' (Kuryłowicz 1965 qtd. in Lehmann 2015:7). This is where the concept of clines comes in to illustrate the development of forms from the less grammatical to the more grammatical. Since a cline is a continuum, as Hopper and Traugott (2003:6) say, a 'natural pathway along which forms evolve', the concept reinforces the nature of grammaticalization itself as a continuum. Every one of the parameters of the process can be imagined as points on a cline in order to visualize the changes that occur.

There are several mechanisms and parameters that accompany grammaticalization that have been studied under different names by different authors. Studying them from a diachronic perspective allows one to identify them in emergent and ongoing processes, creating a kind of checklist under the lens of which new phenomena can be observed. For the needs of this paper, only the parameters that are closely related to the grammaticalization of DMs will be considered.

2.3. Grammaticalization of discourse markers

Given the characteristics of DMs discussed in Section 2.1. and the basic concepts of grammaticalization outlined in Section 2.2., those ideas may now be put together for an analysis of what the grammaticalization process looks like specifically for DMs.

An aspect that was already mentioned in Section 1 is Hopper's principle of de-categorialization, whereby forms in the process of grammaticalization lose, among other things, the 'morphological markers and syntactic privileges' of their class (Hopper 1991:22). While Hopper primarily has in mind the relegation of verbs and nouns to 'secondary categories' (ibid.), there is no reason not to expand this thought to any cline of grammaticalization where morphological and syntactical constraints are lost, including conjunction to DM. As mentioned in Section 2.1., DMs tend to be free of the morphological and syntactic constraints typical for the classes of words from which they derive.

A further parameter of interest for this paper is desemanticization, also called semantic depletion or semantic bleaching (Lehmann 2015:136). The argument here is that a linguistic sign undergoing grammaticalization will lose semantic weight as it assumes its new, more grammatical role. For *though*, this means losing the concessive element in order to function, as Barth-Weingarten and Couper-Kuhlen explain, 'exclusively as a marker of topic organization' (2002:352).

Hopper's principle of layering is another aspect important for the current study. The 'layers' here are different forms within the same functional domain. In Hopper's words, in a language, there is more than one way to 'serve similar or even identical functions' (1991:23). When new forms emerge, for example as a result of grammaticalization, older forms, i.e. layers that served the same function remain and 'interact with the new layers' (1991:23). Applied to the case of *though*, this means that once it starts functioning as a DM, it can interact with other forms that perform the same function, in this case topic shift; Barth-Weingarten and Couper-Kuhlen (2002:354), for example, mention *but*.

The principle of persistence, already outlined in Section 1, is also crucial to both the 2002 study and to this one. Namely, it allows for a category (or, indeed, two categories in the current study) in the data that serves as an intermediary between the two states. On the one hand, it helps us understand the pathway of grammaticalization, and on the other hand, it shows the gradual nature of the process.

3. Concessive marker to discourse marker: the case of though

In this sub-chapter, *though* is first described in its role as a concessive conjunct, i.e. the starting point in the cline of grammaticalization that is of interest for this paper. Then, the conditions that led to language change are outlined. Finally, the findings of Barth-Weingarten and Couper-Kuhlen (2002) are presented.

The patterns of concession in conversation were described by Couper-Kuhlen and Thompson as a 'three-part interactional sequence' (2000:382) which can be schematically presented in the following way:

(1) Speaker A produces X: an utterance that 'states something or makes some point' (ibid.)
     Speaker B produces X': an utterance that acknowledges that X is valid (concession)
     Speaker B produces Y: an utterance that the speaker also considers to be valid, even
     though it may be potentially the opposite of X

The following is an example from the CallHome corpus (used in this paper) that illustrates this pattern of concession with the use of *though*:

(2) A: It's fun having parties.
     B: I know it was really fun it's expensive though.

Using the scheme detailed above, the pattern of concession could be sketched as follows:

(3) Speaker A: X: It's fun having parties.
     Speaker B: X': I know, it was really fun.
     Speaker B: Y: It's expensive though.

Based on this pattern, Barth-Weingarten and Couper-Kuhlen argue that, when three very similar markers of concession (*though*, *although*, and *even though*) are compared, *though* is the most suitable one to assume a discourse-marking function. More specifically, the fact that it is able to carry little prosodical weight, unlike the other two, and that it allows for the X' clause to be

left out of the pattern of concession makes it the most likely candidate for the new role. This is illustrated using the same example as above:

(4)   X: It's fun having parties.
       Y: It's expensive though.

If the same pattern used *although* or *even though*, Barth-Weingarten and Couper-Kuhlen (2002:355) argue that part X' would have to be produced as an entire clause, along the lines of:

(5)   Although it's fun having parties, it's expensive.
       Even though it's fun having parties, it's expensive.

So, the authors conclude, the nature of *though* as a marker of concession put a constraint on its use as a discourse marker (ibid.). In other words, the combination of form and function unique to this linguistic sign allowed for the set of circumstances that enabled it to assume a different function.

In their study, Barth-Weingarten and Couper-Kuhlen analyzed around 35 hours of unprepared spoken American English and British English. The material was taken from 'private conversations, radio phone-ins, TV discussions and radio talk shows' (2002:359). They grouped the tokens of *though* they found in their corpus into three categories: only concessive *though*, textual *though* that retained its concessive meaning, and only textual *though*.

Out of a total of 78 tokens, they labelled 18 as only serving the concessive function, 49 in the mixed category, and 11 in the only textual function. The second category of in-between cases is the largest due to the principle of persistence, as outlined in the theoretical background. It is precisely this category that provides the proof of ongoing language change, which is why the study which is the topic of this paper focuses on it.

The textual use of *though* falls into a category of DMs that Fraser calls contrastive discourse markers (2009:300). They serve to indicate a contrast between two topics (see Barth-Weingarten and Couper-Kuhlen 2002:352). Taking into account the use of *though* in the concessive pattern described above, it is easy to see how one function leads to the other: the conjunct that marked a contrast between two clauses assumed the role of a DM that marks a contrast between two topics.

According to Barth-Weingarten and Couper-Kuhlen, this is an example of an increase in abstractness (2002:353) consistent with a metaphorical leap from the concrete to the abstract.

Their work shows an example of quantifying linguistic change by coding tokens for parameters that the theory takes to indicate change, which makes their study replicable.

The mixed category, where the authors grouped tokens of *though* which retained their concessive meaning while assuming a textual function, will be broken down for the purposes of this study into two groups. The first group contains tokens that retain their concessive function and close the current topic (labelled as concession+topic close). An example from the CallHome corpus is offered in Example (6). In examples taken from the CallFriend and CallHome corpora, the interlocutors are always labelled A and B for clarity, even though the speakers are different in each example. The line containing the instance of *though* is marked with an arrow facing to the right (→). If there are two instances of *though* in the example, that arrow indicates which one of them the explanation refers to.

(6)   A: but he forgets and he pulls that leg up
      B: mm
      A: and it is supposed to be extended
      B: yeah
      A: a little bit you know
      B: mm yeah
  → A: he's a wonderful patient though

The concessive element can be reconstructed as follows:

(7)   X: he forgets and he pulls that leg up
      Y: he's a wonderful patient, though

X' is omitted from the pattern, as is often the case when *though* is used as a concessive conjunct. With this final comment on the patient, the topic of the patient is closed and the speakers are able to move to a different topic. For the purposes of this paper, this state is assumed as the first step from pure concession to topical shift. In Section 5.1., where the heterogeneous group is divided into two subgroups, uses of *though* such as the one detailed above will form the first subgroup, labelled concession+topic close.

The second subgroup consists of tokens of *though* in cases such as in Example (8). The 'hhh' symbol stands for laughter, and any parts of the utterance in square brackets ([]) indicate an overlap in the speech of the two speakers. The (.) symbol indicates a short pause.

(8)   A: well, you you've seen a picture that's it
      A: it's a nice bike
      A: I'm really happy with it
      A: hhh and I'm hhh
      A: well it's it's starting to become a money pit
      B: hhh hhh hhh hhh hhh [hhh]
      A: [especially], especially since I figure
      B: it's going to start getting warm soon, I'll start riding some more
      A: hhh hhh
      A: ooh bad thing
      B: it's not that bad though
      B: I mean hell
  → B: hhh I mean think about what you're getting on your bike though man
      A: yeah
      B: I mean (.) you're going to get a lot of happiness
      B: a lot of exercise

Unlike the first *though* in the dialogue, the second token of *though* indicated with an arrow retains the element of concession while serving to turn the conversation to another topic (from the bike to exercising and life-improvement). The retained concessive pattern could be reproduced as follows:

(9)   X: it's starting to become a money pit

        Y: think about what you're getting on your bike though

This subgroup is closer to the final category, because in addition to the concessive element, there is also a topic shift.

    Finally, a representative of the group where the tokens of *though* have been fully bleached of the concessive element and only serve as contrastive DMs that provide a topic shift can be found in the following example:

(10)   A: [Oh well at least it] least it's good to know that I'm remembered even though I
            don't live there any more hhh hhh] hhh
        B: [hhh hhh hhh hhh hhh] hhh hhh hhh
        A: [oh well]
→   B: [Well I wrote her back] though but I didn't say anything about it because I said
            well it's none of you guys' business there [so]
         A: [hhh] I can't understand how she knows though
         B: well she's kinda gossip central

The token of *though* indicated has no concessive meaning and is redundant – *but* has taken over the role of concession and *though* only serves to shift the topic to the news that somebody from her hometown has learned something about her.

    Theoretically, a greater number of tokens in the first subgroup would suggest a less advanced grammaticalization process, and a greater number of tokens in the second category would suggest that *though* has already gone a somewhat longer way towards becoming a DM.

    In terms of the position, Barth-Weingarten and Coupler-Kuhlen (2002) covered *though* in the final position. However, they do link a more grammaticalized *though* with greater syntactic mobility (2002:352).

    In line with that observation, the greatest syntactic mobility is expected in the very last category containing tokens of *though* that serve a purely textual function as a DM that changes the topic.

4. Data and methodology

The data used in this study were collected by the Linguistic Data Consortium at the University of Pennsylvania before the year 1997 and made available at talkbank.org. Three databases with a total of 217 telephone conversations were used: CallHome (Canavan et al. 1997), CallFriend North (Canavan & Zipperlen 1996), and CallFriend South (Canavan et al. 2020).

    The telephone conversations were unscripted and informal; the participants were instructed to call anybody they wanted and could talk to them free of charge for up to thirty minutes. Both parties participating in the telephone call were informed that it would be recorded, and the recording commenced only after they had both agreed to that. There were no guiding questions or instructions regarding the topic of conversation, which makes the data particularly valuable. Transcripts of the conversations were also made available on the website, and relevant parts of them are used in the course of this paper.

    The average duration of each conversation available on the website with a transcript is five to ten minutes. If the average duration of a conversation is taken to be 7.5 minutes and multiply

that by the number of conversations (217), the approximate volume of data used for this study equals to 27 hours of conversation.

Table 1 shows the number of conversations included in the study for each of the three databases.

Database	CallFriend North	CallFriend South	CallHome
English spoken	American	American	American
Number of conversations	31	10	176

Table 1: Presentation of the data used for this study (Total: 217)

The conversations were searched for tokens of *though* which were then divided first into three, and then into four categories based on their meaning as discussed in Section 2. In the final presentation of the findings in Section 5, the data are not divided according to the database in which they appear, but solely based on the function of *though*.

Instances of *although*, *even though*, and *as though* were excluded from the analysis. The two former are also concession markers, but are considered by Barth-Weingarten and Couper-Kuhlen to be unsuitable candidates for the discourse-marking function, for reasons outlined in Section 3. *As though* is used synonymously with *as if* and is also of no interest for this study.

The kinds of *though* that were considered eligible to enter each category based on their function are detailed in Section 3.

In Section 5.2., the data are further divided according to the position of *though* within each functional category: initial, medial, or final.

5. Findings

In this section the final results of the study are presented, firstly in a similar format as in the Barth-Weingarten/Couper Kuhlen study. Then the second category, where the tokens of *though* are not completely bleached of the concessive element but show a textual meaning, is split into two categories as described in Section 3.

The analysis of the conversations resulted in a total 192 tokens of *though*, distributed as shown in Table 2.

Type of *though*	Number of tokens
Purely concessive	63
Concessive and textual	92
Purely textual	37
Total:	**192**

Table 2: The distribution of tokens of though *found in the 217 conversations*

The proportion of the tokens in the three categories bears a striking resemblance to the proportion in the findings of Barth-Weingarten and Couper-Kuhlen (2002:353).

As in their study, the largest category is the mixed category, with tokens of *though* that have not lost their concessive meaning, but also serve a textual function. Overall, the purely concessive function dominates over the purely textual function with a ratio of over 1.5 to 1, again, similarly as in the Barth-Weingarten/Couper-Kuhlen study.

	Purely concessive	Concessive and textual	Purely textual
■ Number of tokens	63	92	37
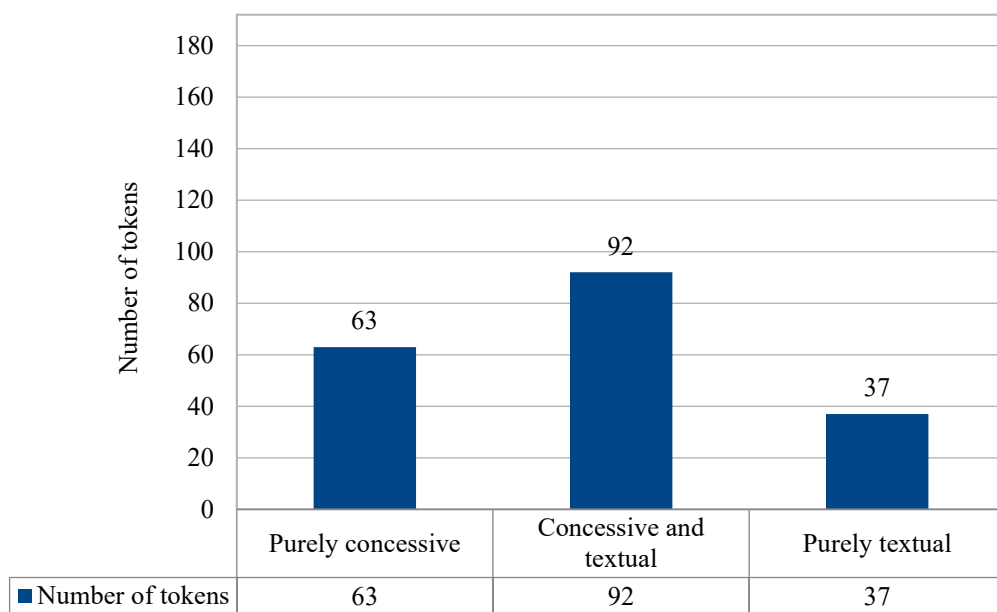
Graph 1: The distribution of the types of though *found in the corpus*

5.1. Layers of concession

This section contains the results with the mixed category divided into two further categories as detailed in Section 3.

Type of *though*	Number of tokens
Purely concessive	63
Concession + topic close	37
Concession + topic shift	57
Purely textual	37
Total:	**192**

Table 3: The distribution of types of though *across four categories*

While there is no clean line of increase or decrease across the different functions, the purely concessive function now seems to dominate as the largest category, with the concession+topic shift close behind. This latter category is postulated as the stage that directly precedes the last

step in the development of *though* as a DM, and is so the category where change is the most evident, especially in terms of syntactic variability, as detailed in Section 3.
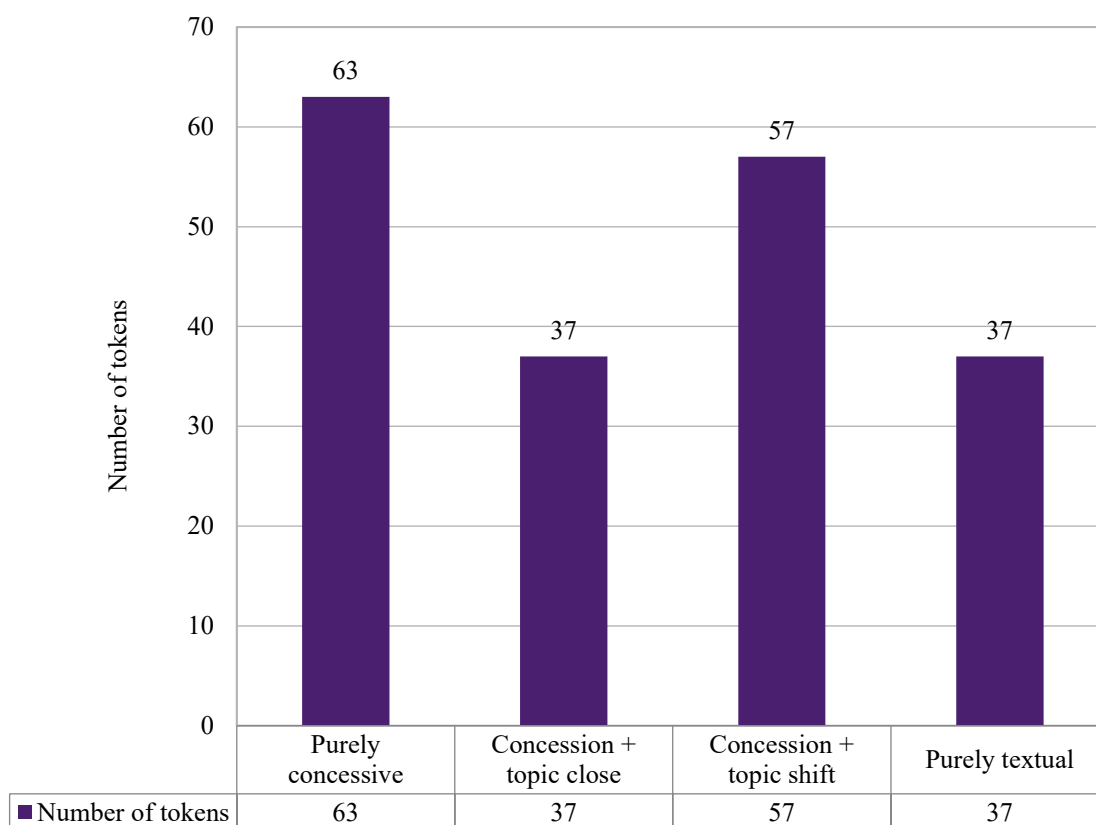
Graph 2: The distribution of the types of though *across four categories*

5.2. The position of though

Finally, in this section, the position of *though* is noted within each of the categories.

Type of though	Initial position	Medial position	Final position	Total
1: Purely concessive	1	22	40	63
2: Concessive+topic close	1	9	27	37
3: Concessive+topic shift	1	33	23	57
4: Purely textual	1	23	13	37

Table 4: The number of tokens in each position within each category

The most effective way to make sense of these data is by considering the percentage of tokens in each position for each category. This is shown in Graph 3.

Interestingly, only one token in the corpus was in the initial position for each function of *though*, so it is worthwhile to consider the variation between final and medial position instead.

If the final position is taken to be the default, since it was described in the concessive pattern and was the topic of the 2002 study, then the category showing the most tokens in the medial position could be considered to be the most grammaticalized, since it shows the greatest syntactic mobility.

This is, as expected, the last category, where *though* only has a function as a DM. This category has 62.16% of tokens in the medial position, more than half and more than any other category. It is closely followed by the category where *though* retains the concessive function and is used to change the topic (Category 3 in the graph), with 57.90% of the tokens, which is again, more than half.

The second category, where *though* retains the concessive element and is used to close the topic of discussion, is a very interesting case in terms of the position of *though*. Namely, even fewer tokens are in the medial position in this category than in the first category, where *though* has a purely concessive meaning. However, this may be explained by the nature of the category. These are cases where the speaker who produces *though* offers a kind of final assessment of the situation and closes the topic in preparation for moving on to a different topic. This kind of *though* is prosodically very downplayed and typically produced at the end of a clause, a dot on the i and the last thing said on a given subject before the speakers move on to a different topic.
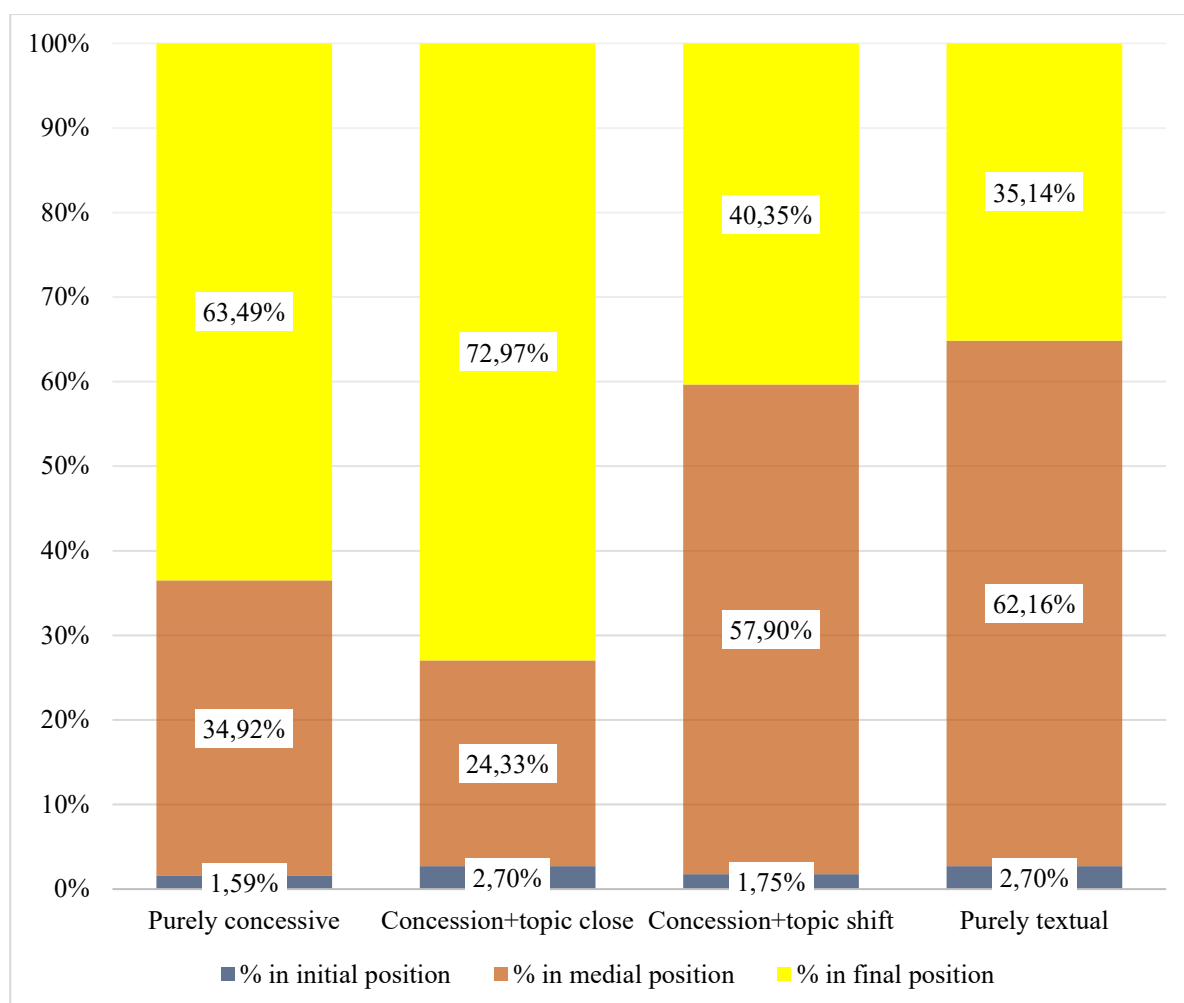
Graph 3: The percentage of tokens in each position within categories

6. Discussion and limitations

First of all, the findings will be compared to those of the 2002 study on final *though*.

The size of the data used in the two studies is comparable, with 35 hours of conversation in 2002 and around 27 hours in the present study. Since the conversations were recorded at around the same time, this also allows for a degree of comparability. Furthermore, they are all spontaneous and unscripted conversations, which gives both studies a great deal of authenticity. However, the settings are different and heterogeneous for the 2002 study, whereas in this study they are all intimate conversations between family and friends.

One possible limitation that stems from the data is that the 2002 study included both British and American English, whereas the conversations used in this study were instances only of American English. Additionally, the socio-demographic information of the speakers was not considered in this study and all conversations were treated the same, regardless of the gender, age, or profession of the speakers.

Next, it is worth mentioning that the number of tokens found differs drastically in the two studies, with 78 in 2002 (see Section 3) and 192 in the current study.

The explanation that offers itself is the fact that Barth-Weingarten and Couper-Kuhlen only considered final *though*, whereas this study includes it in all positions. Other than that, the findings are comparable in the sense that the mixed category, which was taken as evidence of language change by the authors in 2002, is the largest one in both studies.

At this point, the current study branches off into a slightly different direction, since two categories of *though* with a mixed function are postulated. This has proven useful for understanding the development of this concessive marker to a DM. Namely, if the categories are conceptualized as stages in the grammaticalization process, then in stage 2, there is the tendency to produce a clause-final *though* that wraps up a topic in preparation for topic shift. In stage 3, there is much greater variation in the position of though, which often appears in a medial position and retains the element of concession, in accordance with Hopper's principle of persistence, while introducing a new topic of conversation.

Finally, like in the 2002 study, there is a substantial category (stage 4) in which *though* has lost its concessive meaning and shows the greatest syntactic variability, often appearing in environments where it is redundant and where the previous thing uttered by the speaker is simply repeated.

One thing that remains unclear is the variability with regard to position found in the very first stage, where *though* has a purely concessive function. There is no way of telling, from the data, how the categories interact with each other and whether and what the exact kind of correlation is between the position of *though* in the first stage and the likelihood that it will assume the pragmatic function.

The greatest limitation of this study is the subjectivity in assigning the instances of *though* to categories according to function. While it is undoubtedly true that quantifying formal parameters is easier and more objective, it was necessary for this study to look at function and the way it varies across positions of *though*. Quantifying manifestations of parameters of grammaticalization is a good way to dissect and understand the pathway under consideration.

The parameters of grammaticalization taken into account for this particular case were de-categorialization, layering, and persistence (according to Hopper) and desemanticization (according to Lehmann). The phenomenon of phonetic and prosodic reduction was also briefly

touched upon when discussing the differences between *although*, *even though*, and *though* as concession markers in light of the likelihood to be grammaticalized as DMs.

6.1. Grammaticalization and pragmaticalization

Some authors are wary of using the term 'grammaticalization' to describe the type of language change that has been the topic of this paper. Instead, they opt for 'development' (see for example Barth-Weingarten & Couper-Kuhlen 2002 and Van Pottelberge 2006) or 'emergence' (see Auer and Günthner 2005). The term 'pragmaticalization' has also been making the rounds in relation to DMs (see e.g. Aijmer 1997). Aijmer (1997:2) argues that DMs are pragmaticalized rather than grammaticalized, 'since they involve the speaker's attitude to the hearer'. On the other hand, Diewald (2011:371) points out that considering pragmaticalization to be a separate process from grammaticalization commits to a rather narrow notion of grammar. She observes that 'grammar is not restricted to morphosyntactic phenomena...e.g. inflectional morphology...to a particular kind of meaning...[or] to a particular functional plane'.

The notion and scope of grammaticalization are always closely related to the notion and scope of grammar. However, a strong argument for accepting instances of language change such as the one described in this paper as examples of grammaticalization is the fact that the same principles and parameters are used to identify patterns in language change involving both DMs and more prototypical cases of grammaticalization. One such example is the grammaticalization of the noun *thanks* to the preposition *thanks*, which Hopper uses to illustrate his principle of de-categorialization (1991:30). This principle was outlined for *though* in Section 2.1.

7. Conclusion and outlook

This paper presented a partial replication of the 2002 Barth-Weingarten and Couper-Kuhlen study with similar data and methodology. While the findings were replicated when the functions of *though* were grouped into three categories, this study postulated two categories representing two stages of grammaticalization: one where the concessive function was retained and the topic was being closed, and another where the concessive function were retained and another topic was being introduced.

Furthermore, the position of *though* was considered in combination with the functions already outlined. Methodologically, the positions of *though* could have been counted first, then followed by the functions. It would have been particularly valuable to have had both done by different researchers, in order to counter-check the assignment of categories according to function.

The two additional categories being postulated allow for a more detailed illustration of the grammaticalization pathway involving four stages with a more specific function of the element outlined in each.

The fact that the findings were comparable in the two studies seem to suggest that there is indeed an ongoing instance of language change affecting *though*, which has gradually assumed a textual function as a discourse marker. Since parameters that usually accompany

grammaticalization have been applied to explaining this phenomenon, there is a strong argument for treating it as an ongoing process of grammaticalization.

A future study could include instances of *although* and *even though*, in order to further discuss the conditions that make this language change possible, and draw other valuable parallels to the 2002 study. There could also be an attempt to investigate the correlation between position and function.

Work in the area of grammaticalization of DMs is valuable for deepening our understanding of the already well-known and described grammaticalization pathways that enabled the parameters of grammaticalization to be formulated. Additionally, it allows for an important interaction between synchrony and diachrony: known models help to identify emergent phenomena of language change, which in turn inform the established parameters. This interplay ensures that the theoretical framework can accommodate both prototypical and peripheral cases of grammaticalization.

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Reduction, assimilation or variation?
Observations on [nja] in German spontaneous speech

Christiane Ruhrmann, Fabian Brackhane, and Denis Arnold

This paper presents observations on phonetic realisations of the German particles <ja> – 'yes' and <naja> – 'well'. During a large-scale study on the particle <ja>, we identified numerous instances that in the examined dataset had been orthographically transcribed as <ja>, but were phonetically realised as [nja]. Based on phonetic and functional parameters we explore the question whether these instances can be attributed to one of the lexemes <ja> or <naja>. While phonetic measurements yield ambivalent results, analyses regarding pragmatic parameters such as function and turn position indicate that realisations of [nja] in most cases were intended as <ja>. Nevertheless, some functional differences between <ja> and [nja] can be observed.

1. Introduction

Spontaneous speech is characterised particularly by the fact that it is highly variable and subject to constant change at various levels. The German particle <ja> is a good example of this, as it shows a complex spectrum of use in addition to its primary affirmative meaning and function. It is also highly variable at the phonetic level (cf. Brackhane (accepted) and Arnold & Brackhane (in preparation)).

This study presents findings on the phonetic form [nja] and attempts to provide a preliminary answer to the question of the origin and function of this remarkably frequent utterance. It is a by-product of an extensive study of the particle <ja> – 'yes' in a corpus of German spontaneous speech. The particle <ja> is both highly frequent and extraordinarily multifunctional in German: it can be used to confirm the agreement with an utterance of the other person as well as the proposition of one's own statement. In addition, <ja> can be used in a complex way to structure discourse and often fulfils multiple communicative tasks at once. Various studies have identified more than a dozen different pragmatic functions for <ja> (e.g. Brackhane (accepted); Betz 2017; Heringer 1988; Imo 2013; Weidner 2015).

In addition, there are numerous complex particles that are based on <ja>. These include for example <ahja, naja, ohja>, which presumably have semantics that differ from <ja>. Unlike forms such as <jaja> 'yes yes' or <ja aber> 'yes but', they have received little attention in the literature and are not generally regarded as autonomous lexemes in dictionaries of German (Zifonun et al. 1997; Golato 2018; Duden 2019).

Finally, these seemingly clear lexical forms are joined by realisations that can be described as "phonetically extended": forms like [nja, mja, jɔa, jam].[1] These particles are forms that are not known from the written language; the assignment to presumably underlying lexemes is unclear. They could be articulatory reduction forms (for example of <naja> – 'well') or artefacts of not precisely coordinated articulatory gestures of <ja> ("sloppy speech") as well as independent lexemes of spontaneous speech. The "phonetically extended" forms occur far less frequently than "pure" [ja] realisations but are considerably more frequent than most particle combinations with <ja>. Nevertheless, to our knowledge, a systematic description of such variants with a discussion of their origin has not been documented so far.

The study presented here describes observations on the occurrence of the putative /ja/ variant [nja] revealed in the phonetic-functional analysis of the particle <ja> within a corpus of spontaneous speech. The variant [nja] is by far the most frequent form of the "phonetically extended" <ja>. We will discuss the question whether or not formal and functional indications may make it possible to identify one of the lexemes <ja> or <naja> as underlying. With this investigation we hope to shed light on another facet of the extraordinarily complex and fascinating particle <ja>.

2. *<ja> and [nja] in German spontaneous speech*
2.1. *<ja> as a high-frequency particle*

In various corpora of spoken German, the particle <ja> is the most frequent lexeme (Table 1).[2]

GECO[3] (total)	Σ tokens	<ja> 'yes'		<ich> 'I'		<und> 'and'		<das> 'the'		<so> 'so'	
	246.621	10.678	4,3%	10.660	4,3%	7.588	3,1%	6.332	2,6%	6.039	2,4%

KEC[4]	Σ tokens	<ja> 'yes'		<ich> 'I'		<und> 'and'		<so> 'so'		<die> 'the'	
	436.285	20.172	4,6%	17.543	4,0%	11.359	2,6%	10.946	2,5%	9.328	2,1%

DH-IV[5]	Σ tokens	<ja> 'yes'		<ich> 'I'		<und> 'and'		<das> 'the'		<so> 'so'	
	2.125.884	86.479	4,1%	85.537	4,0%	60.525	2,8%	53.984	2,5%	53.674	2,5%

FOLK[6]	Σ tokens	<ja> 'yes'		<ich> 'I'		<die> 'the'		<und> 'and'		<so> 'so'	
	2.719.948	86.875	3,2%	75.760	2,8%	64.226	2,4%	62.224	2,4%	42.355	1,6%

Table 1: Absolute and relative frequencies of the five most frequent lexical words in four different corpora of spoken German.

On the one hand, the combination of the palatal approximant /j/ and the open central vowel /a/ is an uncomplex sequence of sounds in terms of articulation which, due to its high frequency

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[1] In this study, we distinguish between <orthographic>, /phonological/ and [phonetic] representation.

[2] All frequencies reported in Tables 1 and 2 are not based on our own calculations, but on search queries based on third-party annotations in the context of the respective corpus preparation. Deviations from actual instance numbers are therefore possible (see chapter 3.2.).

[3] GECO: German Conversation (Schweitzer et al. 2015).

[4] KEC: Karl Eberhardts Corpus (Arnold & Tomaschek 2017).

[5] DH-IV: Deutsch heute, Interviews (Kleiner 2015).

[6] FOLK: Forschungs-und-Lehr-Korpus gesprochenes Deutsch (Kaiser 2018); DGD version 2.14.

of use, can be postulated as highly "automated". On the other hand, there is a complex differentiation on the functional side, which has found expression in numerous publications (e.g. Heringer 1988; Imo 2013). About a dozen functional uses that can be distinguished from each other can be assumed to be certain, whereby the frequencies of use are very heterogeneous (a separate publication on this issue is in preparation). It is not unusual for <ja> to fulfil multiple functions at once (Imo 2013:159). The frequency of use of particle combinations such as <ahja, naja, ohja>, which are formed with <ja> but presumably differ semantically and functionally, is far below that of <ja>, as is shown in Table 2.

	<naja> / <na ja>		<ahja> / <ah ja>		<ohja> / <oh ja>	
GECO (total)	88	0,04%	53	0,02%	32	0,01%
KEC	573	0,13%	206	0,05%	122	0,03%
DH-IV	1.560	0,07%	82	0,00%	6	0,00%
FOLK	1.667	0,06%	1.132	0,04%	325	0,01%

Table 2: Absolute and relative frequencies of the three most frequent particle combinations formed with <ja> in the four corpora of spoken German from Table 1.

2.2. [nja] as a phenomenon of spontaneous speech

During phonetic data processing in the context of an analysis of the use and formal structure of <ja>, we found numerous forms that can be considered extended variants of /ja/. In these variants, phonetic material is added to /ja/, similarly to forms like <ahja, naja, ohja>. However, unlike these variants, the extended /ja/ variants in question had not been documented in the present orthographic transcription of the corpus; the corresponding instances had instead been transcribed as pure <ja>. What all these extended /ja/ variants have in common is that they do not have a codified lexematic status and, in a first approximation, may be analysed as articulatory variants of <ja>. They are mostly modified at the word boundaries (see Figure 1).
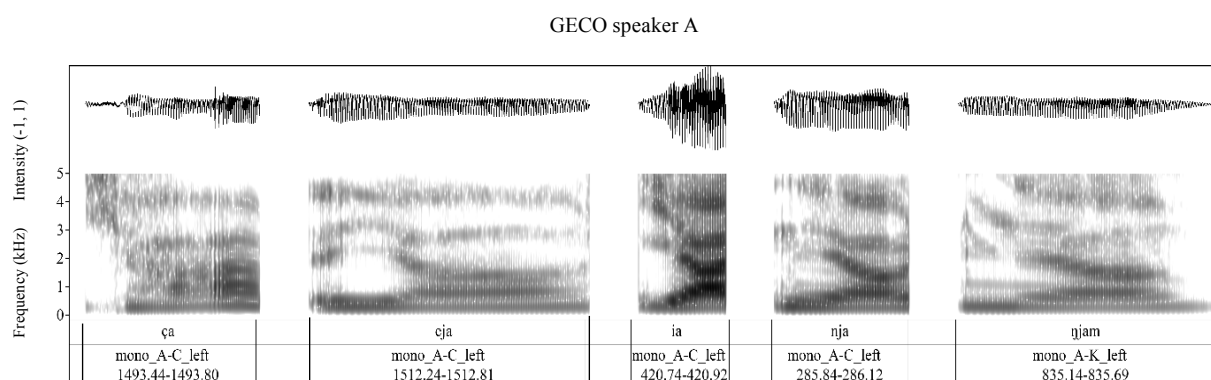

Figure 1: Oscillogram (top) and spectrogram (bottom) of five articulatory variants of <ja> from two monomodal conversations of a speaker of the GECO corpus (speaker A). All variants shown deviate from the phonological form /ja/ (from left to right): [ça, eja, ia, nja, ŋjam]. In addition to the clear differences in duration (x-axis) and intensity (y-axis of the oscillogram), the spectrogram also shows the strongly diverging qualitative expression (especially of the formants F1 and F2).

We could observe a variety of such phenomena in the corpus during data processing. Most of them were presumed additions of nasal sounds to the phonological form /ja/ (Table 3).

Form	[nja]	[ŋja]	[mja]	[jam]	[njam]	[njan]	[eja]	[ŋjam]	Σ
Σ	575	66	41	21	11	2	2	1	730

Table 3: Absolute frequencies of instances orthographically labelled as <ja> in the monomodal part of the GECO corpus, that phonetically represent realisation variants deviating from the phonological form /ja/.[7]

The form [nja] is strikingly more frequent than other variants of the phonetic expansion described (see chapter 3.2.). It shows a differentiated articulatory pattern: The initial nasal phase ranges from being extremely short and hardly perceptible auditorily to being articulated very pronounced temporally (Figure 2). In addition to these differences in articulation, there are also differences in the perceived number of syllables: many of the [nja] instances in the corpus used were spontaneously perceived by the authors as monosyllabic, but others as disyllabic. These observations raised the questions of how to deal with these [nja] instances, which underlying lexeme they should be attributed to and based on which parameters such an identification could take place. Both a bottom-up analysis based on the phonetic material and a top-down analysis based on the pragmatic function of the instances seemed possible.
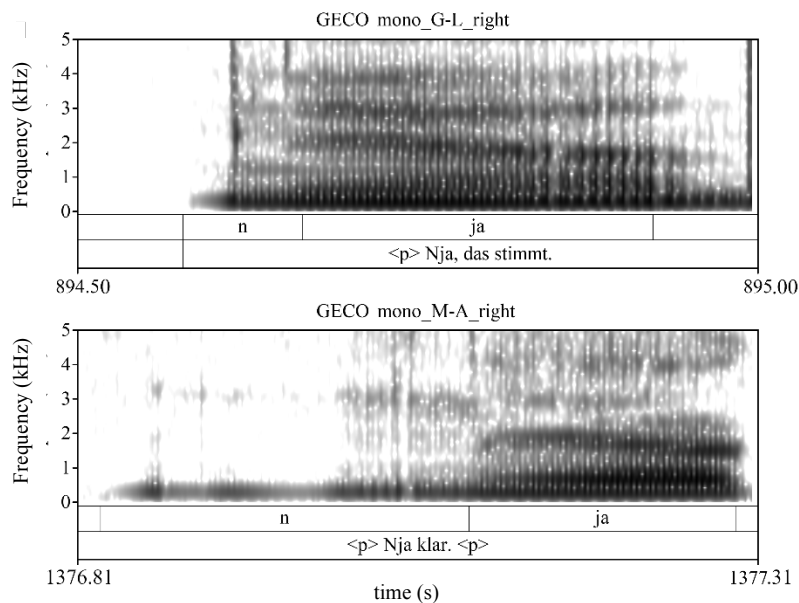

Figure 2: Two excerpts, each 500 ms long, with two turn-initial <ja> instances transcribed as [nja] of the speakers L (top) and A (bottom) in the monomodal part of the GECO corpus. Both instances are in responsive function, but with different degrees of nasal components. Top: duration of [n] 52 ms ≙ 16% of the instance duration, bottom: 250 ms ≙ 56%.

Regarding the phonetic material, it does not seem conclusive to attribute all phonetic variants listed in Table 2, and especially the strikingly frequent form [nja], entirely to articulatory variability or even lax articulatory coordination. Instead, it can be assumed that these

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[7] The variants [ç] and [i] can be regarded as hyperarticulations of the phonologically underlying approximant /j/ and have therefore not been included in this list.

articulatory variants were at least in part produced intentionally and hence also show differences to <ja> regarding their pragmatic function.

The following examples show the occurrence of [nja] instances in two different communicative contexts. They illustrate that the communicative environments in which [nja] occurs can be very different. The transcriptions were made according to GAT 2 (Selting et al. 2009) as basic transcripts with elements of fine transcript where necessary.

In example 1, speaker C reports on her study-related stay abroad in Paris. Speaker A knows this city only vaguely from stories, so C feels motivated to share her enthusiasm about its charms. Speaker A acknowledges her first core piece of information, the great range of leisure activities on offer (line 04), with [nja], thereby signalling to C that she accepts this statement, and that C should continue with her description (line 06). That this request was ultimately unnecessary is shown by the fact that C continues with her narrative even during A's [nja] and illustrates her previous statement with an example. It would be conceivable to use the particle <ja> at this point in its function as a backchannel response, but the use of <naja> would hardly be appropriate.

(1)   [nja] as a backchannel response

```
        01  C:  paRI:S ist halt;
                Paris is just
        02      (1.7)
        03      ha:;
        04      du kannst halt die !GAN!ze zEIt Irgendwas mAchen.
                you can just do anything all the time
        05      °h
 BC     06  A:  n[ja-          ]
        07  C:   [wenn du dich] mit leuten verABredest
                if you make an appointment with people
        08      dann verAbredest du dich-
                 then you make an appointment
        09      <<f>TREFF_me uns> einfach an dem plAtz?
                let's just meet at the place
        10      und dann-
                and then
        11      °h
        12      gibt_s ungefähr ZWANzigtausend mÖglichkeitn,
                there are about twenty thousand possibilities
        13      °h
        14      was man DA dann entschEIdn kann-
                what you can then decide
        15      was man TUT;
                what you do
```

(GECO, mono_A-C, sec. 506-515)

For example 2, the situation is different: Speaker A reports that one of her friends was robbed in Sydney, but fortunately was not seriously injured physically. Afterwards, A sums up that such a robbery is a traumatic experience even without physical wounds. Between these two blocks, [nja] is used (line 15). Here, both the use of <ja> and the particle combination <naja> would be inconspicuous to mark the planning time.

(2)   [nja] as a hesitation marker

```
      01   A:   je-JA
                y-yes
      02        die wurde NACHTS halt ebm-
                she was just at night
      03   C:   o[kE:;]
                okay
      04   A:    [AUS ]geraubt un:;
                 robbed and
      05        °hh
      06        vlEIcht son paar blaue FLECKn [einfach] vom-
                maybe a few bruises just from
      07   C:                                [mhm;   ]
      08        °h
      09   A:   vom FESCHThalten vom grObm-
                from holding her down roughly
      10   C:   mkÄ;
                mkay
      11   A:   Aba: keine PLATZwunden oder so zum [glÜck,]
                but no lacerations or anything like that, luckily
      12   C:                                      [mhm;   ]
      13        °hhh
      14        (0.7)
HM    15   A:   NJA:.
      16        (0.48)
      17        aber E:m scho alLEIN-
                but um even
      18        wenn du [dann mal NACH]ts aus[geraubt ↑wUrdsch   ],
                if you were robbed at night
      19   C:          [ja:;          ]    [du hAst da SCHISS  ];
                        yes                 you are scared
```

(GECO, mono_A-C, sec. 934-955)

2.3. Hypotheses on origin and status of [nja]

The aim of our study is to investigate formal and functional factors potentially suggesting the identification of [nja] with one of the lexemes <ja, naja>. Are parameters such as duration or proportional temporal share of the nasal decisive? Or can an interactional linguistic perspective provide arguments for or against an identification of [nja] with one of the lexemes <naja> or <ja>?

Four seemingly plausible hypotheses regarding the origin and status of the realisation form [nja] can be summarised as follows.

(3)   Hypotheses
   a.   Hypothesis 1: [nja] is an articulatory reduced variant of /naja/. If so, then:
        i.   [nja] should be perceived predominantly as disyllabic ("articulatory prosody")
        ii. its functional spectrum should correspond to that of <naja>

b. Hypothesis 2: [nja] is an articulatory variant of /ja/. If so, then:
   i. [nja] should be perceived predominantly as monosyllabic
   ii. its functional spectrum should correspond to that of <ja>
   iii. [nja] should occur mainly in free-standing positions without coarticulatory influences (nasal articulation due to temporally uncoordinated articulation (voicing and lowered resting position of the velum vs. articulation position of the initial sound))
c. Hypothesis 3: In [nja], variants of <ja> and <naja> coincide articulatorily.[8]
   If so, then:
   i. both monosyllabic and disyllabic perceived instances of [nja] should occur
   ii. its functional spectrum should cover those of both <ja> and <naja>
d. Hypothesis 4: [nja] is an independent form, not a variant of <ja> or <naja>.
   If so, then:
   i. [nja] should be perceived predominantly as either di- or monosyllabic
   ii. its functional spectrum should be clearly distinguishable from both <ja> and <naja>

3. Material
3.1. Data basis

We used the monomodal part of the GECO corpus ("German Conversation") of the Institute for Natural Language Processing Stuttgart (IMS; Schweitzer et al. 2015). This subcorpus comprises 22 dialogues of about 25 minutes each.[9] Participants were twelve young women ("A"-"G" and "I"-"M"[10]) who were unknown to each other before recording began and had no visual contact during the conversation. The number of conversations per speaker varied between two and four.

The recordings are channel-separated with a sampling frequency of 48 kHz. For each dialogue, the IMS created speaker-separated text grids in which the speech contributions were transcribed and automatically segmented at the word, syllable, and sound level (forced aligned).

3.2. Occurences of <ja> and <naja>

In the annotations of the corpus, 4.856 instances of <ja> and 24 instances of <naja> were documented orthographically by the IMS. Our phonetic annotation on an auditory basis yielded a clear difference in overall frequency of both lexemes (Figure 3, see also Tables 1 and 2): for

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[8] Cf. the phonetic string [ˈzɐmɐ], which can be analysed as an extremely reduced realisation of both the phrase <ich sage mal> 'I say' and <sagen wir mal> 'let's say' (Brackhane 2020).

[9] The multimodal subcorpus of comparable size, which is also available, was not included in the analyses, as it would not have been possible to restrict an analysis to the acoustic channel. Wherever in the following unspecified reference is made to "the corpus", we refer to the monomodal part of the GECO corpus specifically. Apart from the illustrative Tables 1 and 2, the multimodal subcorpus was not part of our analyses.

[10] Speaker H is not represented in the monomodal recordings of the corpus.

<ja>, "only" 3.758 instances were also realised as [ja] phonetically. For <naja> – [naja], on the other hand, 77 clear occurrences were found.

The proportion of tokens transcribed as <ja> in the corpus thus amounts to 3,2% of the total number of tokens, while <naja> account for only 0,07%. However, a comparison with the FOLK corpus, which also contains spontaneous speech, but is much larger and completely different in its composition, shows that these proportions are plausible (Table 4).

Beyond these two groups, however, our annotations revealed additional 723 instances which had been orthographically annotated as <ja>. These instances, however, showed extensions with additional phonetic material, but without being particle combinations in a strict sense. While there are certain variations in specific form, they mostly include a nasal consonant (cf. Figures 1 and 4). By far the most frequent form of this phonetic expansion is the word-initial insertion of an alveolar nasal: [nja].
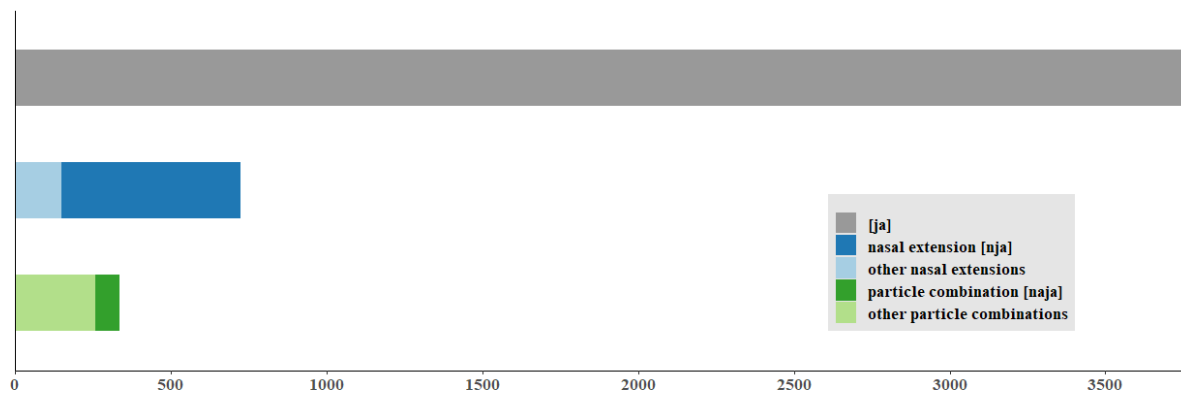

Figure 3: Distribution of instances found in the monomodal part of the GECO corpus among the realisation variants [ja], nasal extensions ([nja, jam, ...]) and particle combinations ([naja, aja, …]) in absolute numbers.

	Σ tokens	<ja> (ct)		[ja] (mc)		<nja> (ct)		[nja] (mc)		<naja> (ct)		[naja] (mc)	
GECO (mono)	115.663	4.856	4,2%	3.758	3,2%	15	0,01%	575	0,50%	24	0,02%	77	0,07%
FOLK[11]	2.719.948	82.823	3,0%	n/a		435	0,02%	n/a		114	0,00%	n/a	

Table 4: Absolute and relative frequencies of the orthographic forms <ja>, <nja> and <naja> in the GECO and FOLK corpora (cf. Table 1). For the GECO corpus, the number of instances of the corpus-side transcription ("ct") differs from that of the instances found in subsequent manual checking ("mc").

3.3. Data processing

In addition to the available TextGrid tiers, all 4.816 verified <ja> instances were phonetically broadly annotated by the second author of this paper on an auditory basis, and the respective segment boundaries were manually checked and corrected. Occurring phonetic extra material such as in [aja] or [nja] was included in the transcript and segmented separately.

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[11] Search query in the interface of the "Database for Spoken German" (DGD) for 'transcribed tokens' (not for 'normalised tokens').

All instances were categorised in terms of their pragmatic function, using the work of Wolfgang Imo (2013) as the basis for the function definitions. The respective turn position of the instance was also recorded based on Sacks et al. (1974; see Table 5).

Function	Description	Turn position	Example
Responsive particle (RP)	*‚Autonomer reaktiver Zug auf eine Äußerung des Gesprächspartners'* 'Autonomous reactive move to an utterance of the interlocutor'	Initial or free-standing; rarer medial or final	*C: Lesen ist immer noch ein bisschen was Anderes als selber dann sprechen.* *A: Ja, klar.* C: Reading is still a bit different from speaking yourself. A: JA, sure. (GECO, mono_A-C, sec. 69-74)
Discourse marker (DM)	*‚Startsignal vor einer Äußerung'* 'Start signal before an utterance', turn- or phrase-initiating	Initial	*A: Ja, wie gefällt dir Stuttgart so insgesamt?* A: JA, how do you like Stuttgart overall? (GECO, mono_A-C, sec. 704)
Modal particle (MP)	*‚legt dem Rezipienten nahe, dass er einen Sachverhalt als bekannt ansehen soll'* 'Suggests to the recipient that he or she should regard a fact as known'	Medial	*C: Vielleicht wird der Wunsch ja wahr.* C: Maybe the wish will JA come true. (GECO, mono_A-C, sec. 235)
Backchannel response (BC)	*‚Stützendes Signal mit der Funktion, dem Sprecher zu signalisieren, dass er weitersprechen kann / soll',* *‚Alternative zu mhm'* 'Supporting signal with the function of signalling to the speaker that he or she can / should continue speaking', 'Alternative to mhm'	Free-standing	*A: Und dann haben wir heute Morgen dort eben noch das Zelt und alles putzen können.* *K: Ja.* *Und dann bin ich jetzt wieder nach Stuttgart gefahren.* A: And then we were able to clean the tent and everything there this morning. K: JA. A: And then I went back to Stuttgart. (GECO, mono_A-K, sec. 397-403)
Hesitation marker (HM)	Signalling uncertainty, hesitation, planning	Medial or free-standing	*A: Die anderen haben dann noch Theorie-Einheiten gehabt* *C: Mhm.* *A: und... ja, ich konnte es dann ein bisschen mehr genießen.* A: The others had theoratical lessons as well C: Mhm. A: and... JA, I could enjoy it a bit more. (GECO, mono_A-C, sec. 427-433)
Discourse structuring (DS)	Turn organisation, e.g. attention control, quotative marking or self-affirmation	Medial or final, rarer initial	*C: Vorher habe ich schon gedacht, ja, ich könnte es mir eventuell vorstellen.* C: Before, I thought, JA, I could possibly imagine it. (GECO, mono_A-C, sec. 206-210)
Termination signal (TS)	*‚Ende einer Äußerung, Sequenz etc. signalisieren'* 'Signalling the end of an utterance, sequence, etc.'	Final	*A: An der Ostküste war es richtig cool zum Schnorcheln.* *C: Okay.* *A: Ja.* A: On the east coast it was really cool for snorkelling. C: Okay. A: JA. (GECO, mono_A-C, sec. 1355-1359)

Table 5: Pragmatic functions of <ja>; sorting in descending order of frequency in the monomodal part of the GECO corpus; quotations according to Imo (2013:196). The examples are normalised orthographically.

3.4. Measurements

For the phonetic annotations and measurements, the software Praat (Boersma & Weenink 2020) was used, for the illustrations and calculations additionally R (R Core Team 2020) and RStudio (RStudio Team 2020).

To determine the durations of the examined instances, we systematically checked all /ja/ word boundaries originally set with a forced alignment procedure and corrected them by hand; the duration values of all instances were then determined by script. The instances transcribed on the phonetic level as [nja] were segmented in a first step only for their [ja] part when all <ja> instances were recorded. At a later stage, they were also segmented on a separate TextGrid level including the nasal outside the [ja] string, so that continuous measurements with and without this part were possible (Figure 4).
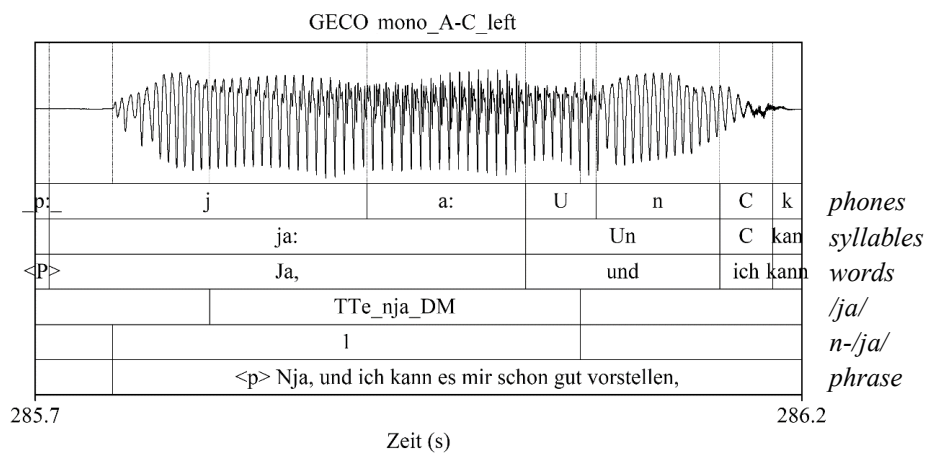
GECO mono_A-C_left

p:	j		a:	U	n	C	k	*phones*
	ja:			Un		C	kan	*syllables*
<P>	Ja,			und		ich	kann	*words*
	TTe_nja_DM							*/ja/*
	1							*n-/ja/*
	<p> Nja, und ich kann es mir schon gut vorstellen,							*phrase*

285.7   286.2

Zeit (s)

Figure 4: Annotation levels of a <ja> / [nja] instance (from top to bottom): phonetic, syllabic and word level (forced aligned); <ja> instance, segmented without nasal part, with labels for turn position ("TTe") and pragmatic function ("DM"); instance segmented with nasal part, with annotation of the perceived syllable number; phrasal context (orthographic).

For the 575 instances identified as [nja], the proportion of the initial nasal was determined. In addition, all instances were annotated for their perceived syllable count. Although this subjective annotation was based on the audio signal only, its results were also supported by an instrumental analysis of intensity: Figure 5 shows two [nja] instances with their intensity contours. While the one shown on the left was rated as monosyllabic, the instance on the right was rated as disyllabic. This perceptual distinction is supported by the representation of the intensity contour, which shows clear differences. The obtained values could then be correlated with the measured durations and proportional nasal parts.
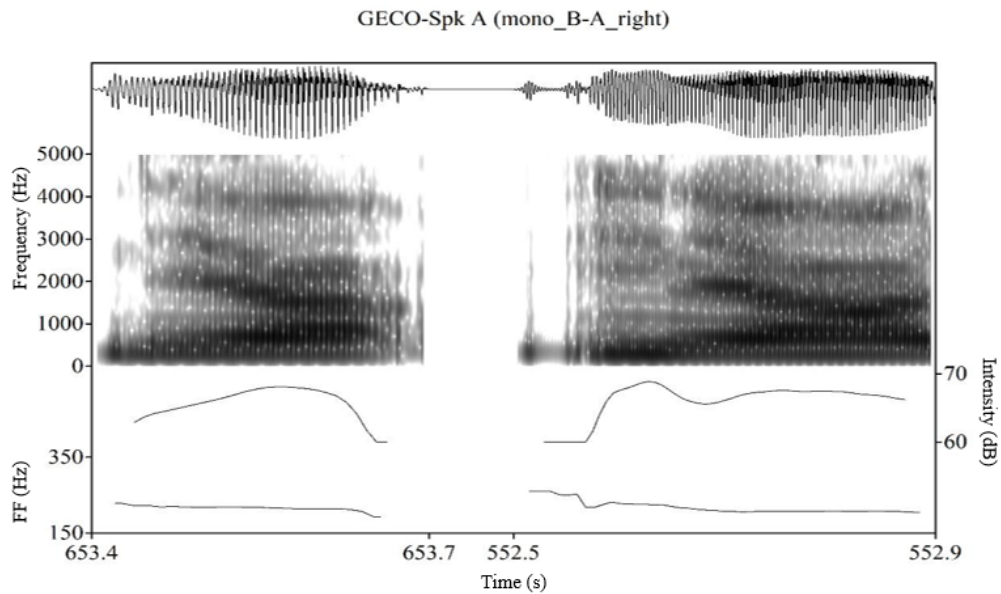
GECO-Spk A (mono_B-A_right)

Figure 5: Oscillogram, spectrogram, intensity, and fundamental frequency of two [nja] realisations of GECO speaker A. The left instance was evaluated as monosyllabic, the right instance as disyllabic.

4. Results
4.1. Frequencies and functions

In the monomodal part of the GECO corpus, 4.863 instances were orthographically transcribed as particles <ja>. In the combined acoustic-instrumental check, we were able to detect nasal extensions such as [nja, mja, mjam]. The variant containing an initial alveolar nasal, [nja], is by far the most frequent (n = 575). For [naja], however, only a few instances were detectable (cf. Table 3).

The instances transcribed as [ja], [nja] and [naja] show considerable differences not only in their absolute numbers (see Tables 2 and 3), but also in their absolute and relative distribution regarding the pragmatic function (Table 6).

| | [ja] | | [naja] | | [nja] | | | | | |
					1 σ		2 σ		Σ	
Responsive particle	**1.057**	**28,1%**	3	3,9%	160	36,6%	64	46,4%	224	39,0%
Discourse marker	739	19,7%	23	29,9%	67	15,3%	21	15,2%	88	15,3%
Modal particle	661	17,6%	0	0%	0	0%	0	0%	0	0%
Backchannel response	532	14,1%	8	10,4%	136	31,1%	30	21,7%	166	28,9%
Discourse structuring	342	9,1%	2	2,6%	22	5,0%	6	4,4%	27	4,7%
Hesitation marker	244	6,5%	**28**	**36,4%**	42	9,6%	11	8,0%	53	9,2%
Termination signal	183	4,9%	13	16,9%	10	2,3%	6	4,4%	16	2,8%
Σ	3.758	100%	77	100%	437	100%	138	100%	575	100%

Table 6: Absolute and relative distribution of the instances transcribed as [ja], [naja] and [nja] according to their pragmatic function. The most frequent functions have been highlighted.

Speakers use 29% of their clear [ja] instances as responsive particles and 14% as backchannel responses. Similarly, a large proportion of [nja] instances are used either as responsive particles (39%) or backchannel responses (29%). In contrast, [naja] is not used in these two functions in our data, whereas it occurs more often as hesitation marker (36%) or discourse marker (30%). The latter represent only 20% of the instances for [ja] and 15% for [nja].

The form [nja] does not occur fulfilling the function of a modal particle, which must be considered particularly susceptible to coarticulatory processes due to their turn position (turn-medial and unaccented). For [ja], modal particles make up just under 18% of the instances.

More than half of the [nja] instances occur free-standing, without being integrated into an intonational phrase (58%). Turn-initial uses are less frequent (29%), but still appear more often than turn-final uses (13%). Instances of [nja] in turn-medial position occur only sporadically (1%).

Regarding the perceived number of syllables in [nja], there is no difference in the evaluation of pragmatic function. Both for the [nja] instances perceived as monosyllabic and for the – significantly rarer – instances perceived as disyllabic, foci of use are on free-standing backchannel responses and responsive particles. Another focus for both groups is on turn-initial discourse markers.

4.2. Duration, number of syllables, proportion of [n]

In processing the data, the instances identified as [nja] had been segmented separately for both the overall instance and the [ja] part (cf. Figure 4). In addition, the perceived syllable count had been annotated for these instances.

Regarding the average duration values, our data indicates that the variation patterns of [ja] and [nja] instances show considerably more similarities to each other than to that of [naja], especially when the respective pragmatic function is taken into account. However, due to the very heterogeneous frequencies (cf. Table 6), no further statement beyond this general observation can be made on this aspect.

Figure 6 shows the distribution density of all examined [nja] instances regarding their absolute duration and the proportional share of the nasal [n], considering the perceived number of syllables. Instances that were annotated as disyllabic [nja] make up 24% of the [nja] instances (cf. Table 4). However, these realisations show no categorical differences from the instances annotated as monosyllabic, neither in their total duration nor in the proportion of the nasal in the total token. Nevertheless, one can recognise certain tendencies: instances judged as disyllabic tend to show a larger proportional nasal share and a higher total duration. The latter averages 408 ms compared to 305 ms for instances rated as monosyllabic. However, the characteristic of two distinguishable intensity peaks, as illustrated in Figure 5 on the right, is shown by only 71 of the 139 instances auditorily rated as disyllabic, while 61 contours show only one intensity peak.[12] Among the 437 instances rated as monosyllabic, no instances with two intensity peaks were observed.

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[12] No meaningful intensity contour could be determined for the remaining 7 instances.
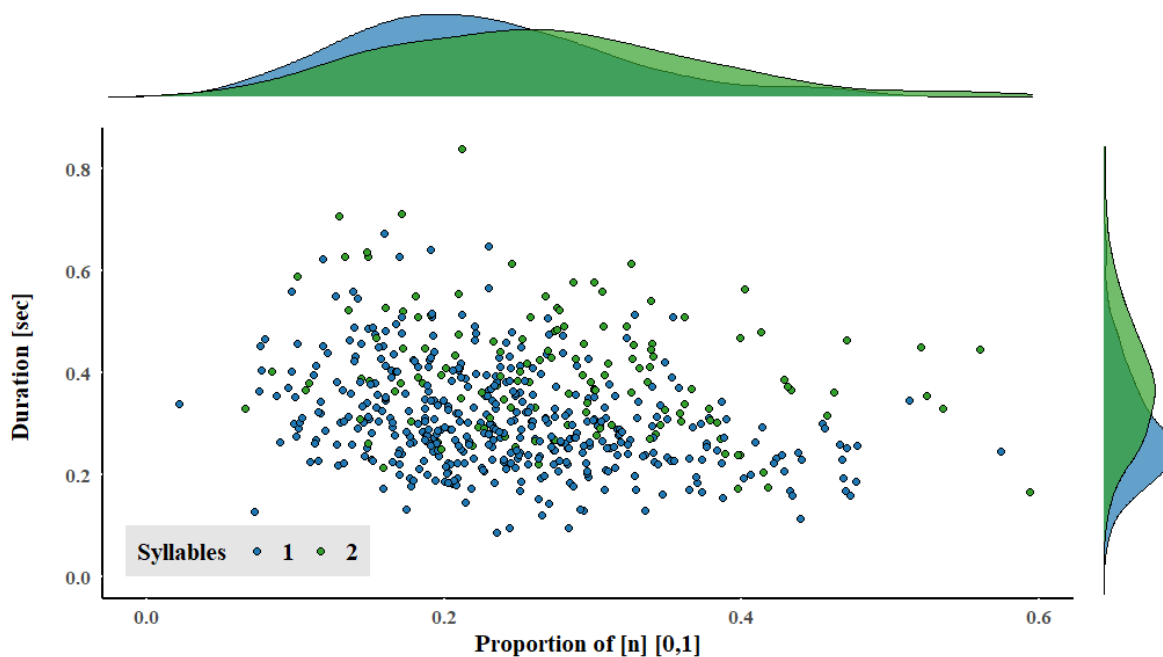
Figure 6: Absolute duration (y-axis), proportional [n] share of total duration (x-axis) and perceived syllable count (colour) for all examined [nja] instances.

A correlation between the proportional expression of the [n] part and the pragmatic function of the instances could not be established (Figure 7).
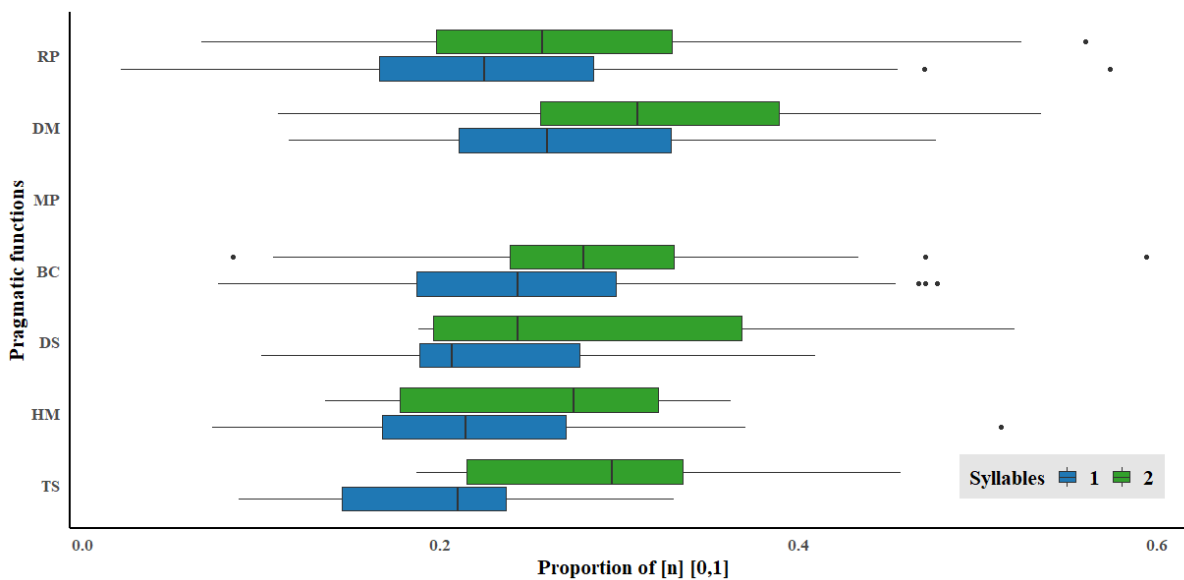

Figure 7: Proportional [n] share of the total duration of all examined [nja] instances (x-axis), divided according to pragmatic function (y-axis) and perceived syllable count (colour).

4.3. Frequencies per speaker

To test our hypotheses listed in chapter 2.3., a look at the speaker-specific distribution can also provide clues: If [nja] is merely an articulatory variant of /ja/ (hypothesis 2), a speaker-specific, clearly heterogeneous distribution can be seen as an indication of a usage that is especially idiosyncratically conditioned.

The distribution of the [nja] instances among the individual speakers shows considerable differences in three respects: with regard to the absolute numbers per speaker, the share of the total <ja> realisations per speaker and the share of the total token count per speaker. Table 7 synoptically relates the [nja] quantities of all twelve speakers to their total quantities of /ja/ realisations and total number of tokens.

	Σ [nja]	Σ [naja]	Share of total [nja] instances	[nja] share of <ja> total per speaker	[nja] share of total tokens[13] per speaker
A	138	10	23,9%	27,4%	1,5%
B	3	7	0,5%	1,3%	0,0%
C	57	11	9,8%	13,0%	0,9%
D	38	4	6,6%	10,0%	0,7%
E	21	3	3,6%	4,0%	0,2%
F	45	7	7,8%	8,9%	0,6%
G	20	8	3,5%	9,3%	0,4%
I	18	1	3,1%	10,0%	0,4%
J	18	7	3,1%	5,3%	0,2%
K	49	3	8,7%	10,0%	0,4%
L	99	3	17,2%	24,8%	1,1%
M	69	13	12,0%	25,9%	0,7%
	Σ = 575	Σ = 77	Σ = 100%	Ø = 12,9%	Ø = 0,6%

Table 7: Number of instances we transcribed as [nja] or [naja] per speaker, share of instances transcribed as [nja] in the total number of [nja] instances, the total number of <ja> instances per speaker, and their total tokens.

The divergences that emerge here are striking: Speaker A, with 138 [nja] instances, accounts for 24% of all [nja] instances identified in the corpus. The three speakers A, L and M realise – with different absolute numbers of instances – a total of more than half of all [nja] instances in the corpus, with this form accounting for more than a quarter of their <ja> uses each. A completely different finding can be seen with speaker B: She produces very few [nja] instances, both in absolute terms (n = 3) and relatively (0,5%) to her <ja> frequency. However, the proportion of the total number of tokens shows that this finding is by no means due to the fact that B spoke little overall during the recordings. The speakers L and M, on the other hand, also show quite high proportions of [nja] use, 17% and 12% respectively. The frequency of [nja] realisations thus does not seem to be directly related to the speaker-specific frequency of use of <ja> and their absolute token frequencies.

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[13] Total token count based on forced aligned transcripts.

[nja] in German spontaneous speech

The comparison with the number of uses transcribed as [naja] per speaker shows no direct connection with this observation. Speaker B does not "compensate" for her very few [nja] instances with an above-average number of [naja] instances. On the contrary, the four speakers A, C, G and M show the most [naja] uses and still an above-average number of [ja] instances.

A breakdown of the [nja] instances for each speaker and each of her interlocutors also shows that the distribution of [nja] instances seems to be not only a speaker-specific, but even a conversation-specific phenomenon (Table 8). For example, speaker A uses significantly more [nja] instances in her conversations with partners L and M than in the conversations with partners B and C. In the conversation with partner M, A produces most of her [nja] instances. Speaker M, on the other hand, uses the most of her [nja] instances in the conversation with B. In only three of the 22 pairings do both interlocutors produce the highest proportion of their respective [nja] instances: C-K, D-J and E-I.

[nja]		Speaker											
		A	**B**	**C**	**D**	**E**	**F**	**G**	**I**	**J**	**K**	**L**	**M**
Partner	A		0,0%	**22,8%**							16,0%		20,3%
	B	21,7%						5,0%				28,3%	**40,6%**
	C	16,7%				14,3%	8,9%				**42,0%**		
	D							50,0%			**55,6%**	36,4%	
	E			17,5%			20,0%		**55,6%**	5,6%			
	F			22,8%		23,8%				5,6%	**34,0%**		
	G		66,7%		13,2%							13,1%	
	I					**38,1%**				33,3%			
	J			47,4%		23,8%	**46,7%**		44,4%				
	K	28,3%		**36,8%**		24,4%							14,5%
	L		0,0%		39,5%			**45,0%**					24,6%
	M	33,3%	33,3%								8,0%	22,2%	
	Σ	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 8: Proportional distribution of [nja] instances of all speakers (columns) per partner (rows). The pairings with the highest proportions have been highlighted.

5. Discussion

Originally, the authors' motivation for a study on the particle <ja> was to investigate a debatable form-function coupling in <ja>. The processing of the phenomenon [nja] was added later, when it became clear during the phonetic-functional data processing how extensive the use of this specific variant appears to be — even though it was not documented in the corpus.

The present study thus highlights a fundamental dilemma in working with corpora of spoken language: For reasons of labour economy, the orthographic or even phonetic-wide annotation of large data sets must be carried out in a certain schematic and more or less automated framework and, moreover, is usually distributed among several workers. The fact that this approach inevitably leads to inconsistencies and losses in precision is accepted for lack of practicable alternatives. For the corpus used in our study, however, it can be shown that a review and re-annotation can reveal considerable deviations and, above all, new insights, at least for individual phenomena: Only 24 of the 77 instances we identified phonetically as [naja] had also

been marked orthographically as <naja>. Most of the remaining instances had been transcribed as <na ja>, which made retrieval by means of regular expression more difficult due to pause segments that were automatically inserted in the context of forced alignment. Since, in our case, the entire phonetic post-annotation was carried out by a single person, it can be assumed that our annotation was largely consistent.

Not only do the frequencies of <ja> and <naja> determined in this way show clear differences from the numbers of instances previously documented orthographically in the corpus. The segment boundaries set by a forced alignment procedure were also largely in need of correction, which is hardly surprising considering the underlying mechanisms. Finally, the present study would not have been possible at all without our elaborate form of post-annotation since the phenomenon of phonetically extended /ja/ instances in the corpus had only been documented very sporadically in the transcription and the instances in question had been annotated as regular /ja/ instead.

To the best of our knowledge, the phenomenon of [nja] has not received any attention in the research literature thus far. Nevertheless, an investigation seemed to be both worthwhile and necessary in view of the astonishingly high frequency of [nja].

Our results indicate that of our four hypotheses posed in section 2.3., the second ('[nja] is an articulatory variant of /ja/') was most clearly supported by our findings: Instances of [nja] show a functional spectrum similar to that of clear [ja] instances, although [nja] never occurs as modal particle. Moreover, [nja] is mostly (but not exclusively) perceived as monosyllabic. However, instrumental phonetic parameters regarding the number of syllables show a different picture from the perceptual findings: Only slightly more than half of the almost 22% of the [nja] instances that were judged to be disyllabic also show two intensity peaks. With regard to the duration and proportional share of the nasal [n], the analysed instances do not show a clear dichotomous distinction. Instead, both parameters show considerable intersections between the instances judged as monosyllabic and disyllabic. However, no divergent tendency regarding their functional distribution can be detected in these instances, so that neither the attribution of [nja] to <naja> (hypothesis 1) nor a merge of <ja> and <naja> in [nja] (hypothesis 3) seem plausible. Likewise, hypothesis 4 must be rejected: The functional spectrum of the [nja] instances does not show any independent characteristics but is similar to that of the clear [ja] instances. Consequently, it cannot be assumed that it is a functionally independent form.

The distribution of the [nja] instances regarding their position in the turn (or intonation phrase) shows clear preferences for free-standing and turn-initial uses (87%). Turn-medial usages occur only sporadically. The variant [nja] thus occurs preferentially in contexts in which the left word boundary of the presumed underlying /ja/ is not influenced by coarticulatory processes. The lack of occurrence of [nja] in certain functions (especially phrase-medial modal particles) would therefore be regarded as a secondary effect of these articulatory conditions.

It can therefore be stated that [nja] appears to be an articulatory variant of the high-frequency particle <ja>. However, considerable idiosyncratic tendencies can be observed here. Of course, the frequency of use of <ja> is generally very speaker-specific and is also always determined by the concrete context of the conversation.

This is also shown by the analysis of the [nja] occurrences, broken down by dialogue. Here, a heterogeneous distribution of instances per speaker in her dialogues with different interlocutors can be observed. This circumstance suggests that it is not a matter of context-independent idiosyncratic use, but that it is at least co-determined by situational factors. However, we can only make assumptions about what these factors are: An effect of

accommodation to the respective interlocutor and her use of language comes into consideration here, as does an effect of the absolute conversational shares and "roles" of the speakers in the respective dialogues. But a variety of other, partly external factors (such as tiredness, sympathy, etc.) are also possible, so that only affirms the strong interpersonal variability.

From a phonetic perspective, the finding that [nja] is a positional and situational articulation variant of /ja/ is both plausible and surprising: plausible, since a temporal coordination of the articulators tongue and velum with the vocal folds, which is not always precise, can be regarded as typical for spontaneous utterances, and surprising, since it can be assumed that an articulation as uncomplex and frequent as /ja/ does not require a particularly consciously controlled articulation. If at least some [nja] instances were intended <naja> occurrences, it could be assumed, according to the "articulatory prosody" described by Niebuhr & Kohler (2011), that they would also be perceived and functionally evaluated as <naja> by listeners (and annotators). However, the analyses clearly show that the functional emphasis of [nja] is completely different from that of <naja>. This raises the question of whether [nja] is either the product of under-coordination at the phonetic level in the interest of economy of articulation or whether it might not also fulfil a function at the pragmatic level, for example, signalling relaxedness or negating time pressure.

An essential aspect for identifying [nja] with <ja> or <naja> would be the comparison of the average lexeme duration values. It could be expected that these would have to be distinguished from the respective "contrast lexeme" depending on the underlying lexeme. Although there seems to be a basic tendency that the [nja] instances are more inclined to the distribution and variation of the clear [ja] instances, this aspect seems not suitable for a statistical test due to the massive differences in the number of records (for example for responsive particles: 1.057 [ja], 224 [naja], 3 [nja]).

The integration of subjective syllable number perception into an objective instrumental phonetically based work was unquestionably a difficult undertaking. Aware of the contradictory nature of the two approaches (cf. Grice & Barry 1991a,b), this combination was nevertheless an attempt at gaining further insight into the complex phenomenon of [nja]. Our investigation was able to show that far more instances are perceived as disyllabic than would have been expected from the instrumental phonetic analysis. In turn, this raises the question of which parameters were decisive for the perceived disyllabicity, if it was not the instance-internal intensity maxima. With Niebuhr & John (2014), it can be assumed that the exact time ratios between [n] and [ja] might play a significant role here. An above-average length of [n] may suggest to the listener the perception of one or even several additional syllables (Niebuhr & John 2014:136). Another finding concerns the likewise subjective perception of the segmental distribution of the [nja] perceived as disyllabic: while some seem to be clearly perceived as [n.ja] or [nja.a], this distinction is not possible for a considerable number of instances.

A further investigation of the phenomenon with the help of perception experiments could contribute to revealing insights here. In addition, it could be tested whether [ja] and [nja] can really be used interchangeably in all functions and positions. Further research on possible influences of segment durations on perception is also desirable. The aspects of intonation and prosody had to be left out of this work for reasons of scope. Following on from Kehrein & Rabanus (2001), however, further research in this area would undoubtedly be worthwhile.

It is astonishing that this phenomenon, despite its rather high frequency, does not seem to have found any significant expression in the literature so far and is only implicitly documented in resources such as the "Database of Spoken German" (DGD, cf. Table 4). Even the

"Dictionary of Spoken German" does not address phonetic realisation variants of <ja> (Torres Cajo 2019). However, it must be assumed that the observed variant [nja] is by no means a situational/conceptual phenomenon that can only be observed in the context of the corpus used or its design, but a generally occurring fact of German spontaneous speech.

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